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## AN ESSAY ON THE ACTIVE CONSTITUENTS OF ERGOT OF RYE.

By William T. Wenzell.

The greatly discordant views advanced by chemical writers on *Secale cornutum*, and a desire to investigate the proximate chemistry, of this degenerated cereal, have induced me to take up this apparently difficult subject. I have succeeded in isolating two vegetable nitrogenized alkaloids, the first of which I have provisionally denominated "Ecbolina," a name naturally suggesting itself by the ecbolic or womb contracting power peculiar to the crude drug, and which physiological action I believe to reside in that alkaloid. To the second alkaloid I have given the name of "Ergotina." It is further intended to show in this treatise, that "Propylamina," (the Secaline of Dr. Winkler,) exist in Ergot preformed, and that the acid peculiar to spurred rye, "Ergotic Acid," is volatile.

### PRELIMINARY EXAMINATION.

A cold prepared aqueous solution of Ergot possesses an acid reaction. This reaction is, I believe to be, owing to the existence of an acid phosphate of magnesia, for on adding carbonate of baryta in excess, and shaking, the acid reaction is not removed. But on adding sufficient solution of potassa to neutralize the infusion, the basic phosphate of magnesia is precipitated, and by adding now sulphate of magnesia, an additional quantity of the phosphate is precipitated. The infusion is precipitated by acetate of lead, nitrate of silver, and barytic water, phosphates and ergotates of the re-

spective bases being precipitated. Lime and potassa, the latter in greater quantity, were found. Phospho-molybdic acid and bichloride of mercury caused voluminous precipitates.

### COURSE OF ANALYSIS.

A cold prepared aqueous infusion of Ergot was precipitated with acetate of lead. The filtrate, after being deprived of lead by sulphide of hydrogen, was treated with a mixture consisting of equal parts of saturated solutions of bichloride of mercury and bicarbonate of potassa, (bichloride of mercury does not by itself completely precipitate the infusion,) the well washed precipitate suspended in water, and then decomposed by passing sulphide of hydrogen through it. A portion of the filtrate, on being evaporated spontaneously, deposited minute, colorless, but well defined cubical crystals. On adding to another portion a solution of potassa in excess and heating, the pungent ammoniacal odor of propylamina were evolved. The solution responded to the test for chlorine. Phospho-molybdic acid gave a voluminous, flocculent, yellowish precipitate. On evaporating a portion of the solution, the solid residue gave on heating a sublimate of chloride of propylamina, accompanied by free hydrochloric acid, a considerable quantity of carbonaceous residue being left behind. To another portion of the solution was added potassa in excess, and heated until no more propylamina was given off; then, on acidulating the solution with hydrochloric acid and testing with phospho-molybdic acid, voluminous precipitates were obtained. These reactions clearly indicated the presence of another substance besides propylamina. After many fruitless attempts to separate the mixed bases fractional precipitations, as seemingly promising the best results, were tried.

For this purpose a cold prepared infusion of eight ounces of finely pulverized Ergot in one quart of water, after being neutralized by potassa was precipitated by chloride of barium, filtered, to the filtrate half an ounce of bicarbonae of potassa was added, and after its solution again filtered. To this filtrate four ounces of a saturated solution of bichloride of mercury was added, allowed to stand twelve hours, and the precipitate,

which had then completely separated, collected on a filter, washed, suspended in water, decomposed by hydro-sulphuric acid and finally filtered.

The filtrate from the mercurious precipitate being similarly and successively treated as at first until no further precipitate was obtained, and each precipitate marked or numbered according to its succession. Of the six precipitates thus obtained, the first three, Nos. 1, 2 and 3, were greyish white and voluminous, and the remaining three, Nos. 4, 5 and 6, were nearly white and very dense. Solutions Nos. 1 and 2 each exhibited the color of sherry wine, and preserved an acid reaction, and on evaporation left no crystalline deposit. Potassa did not eliminate propylamina. The solution was found to consist of Ecbolina together with a small quantity of Ergotina, both in combination with hydrochloric acid.

Solution No. 3 was colored and reacted similarly to the preceding solutions. It turned quite dark during the evaporation. Liquor potassæ eliminated propylamina. No Ecbolina was detected. Ergotina was apparently the principal alkaloid contained therein.

Solutions Nos. 4, 5 and 6 consisted principally of chloride of propylamina and ergotina, accompanied by considerable free hydrochloric acid.

Seeing that even fractional precipitations, although successfully employed for the discovery of the two bases, did not prove entirely successful to separate them completely from each other, the following method has ultimately afforded more satisfactory means of isolating each alkaloid, and depends upon the property of Ergotina, of not being precipitable from acidulous solution by bichloride of mercury, and that propylamina is not precipitated by phospho-molybdic acid.

A cold prepared infusion of Ergot is to be precipitated with acetate of lead, the filtered solution treated with sulphide of hydrogen, the filtrate concentrated, and then finely powdered bichloride of mercury added and shaken after each addition, as long as a precipitate may be formed. This precipitate, after washing, decomposing with S. H., and filtering, will be found to contain the Ecbolina alone in the state of a chloride.

The filtrate from the precipitated chloride of mercury and Ecbolina is treated with phospho-molybdic acid as long as a precipitate may be obtained. The washed precipitate on being suspended in water with carbonate of baryta added to excess, and then digested with a gentle heat until the yellowish color of the mixture is replaced by a pure white, with the evolution of carbonic acid, The decomposition is now complete, and the filtered solution containing the alkaloid in its isolated state may be obtained solid by careful evaporation.

The Ecbolina was, by the following necessary and more complicated process, obtained in the state of isolation. The phospho-molybdic acid compound of Ecbolina cannot be decomposed like that of Ergotina, by simply heating the suspended precipitate with carbonate of baryta, and on evaporating the mixture to dryness in a water bath, according to the direction given by Dr. Sonnenschein, decomposition is indeed effected, but with nearly the entire loss of the alkaloid. The following method has succeeded in my hands but with a comparatively small loss.

The chloride of Ecbolina is to be treated with an excess of phosphate of silver and the chloride of silver, which is formed by the double decomposition with any excess of the phosphate removed by filtration. To the filtrate is to be added sufficient hydrate of lime, and the mixture well shaken until the phosphoric acid is entirely combined with the lime. The solution is then to be filtered from the precipitated phosphate of lime and any excess of lime, and for removing the lime still held in solution, a stream of carbonic acid is passed through it until litmus paper is reddened. On gently warming the solution, carbonate of lime is deposited and the gas expelled. The filtered solution now contains the alkaloid in the isolated condition, and may be obtained by careful evaporation at a low temperature in the solid state.

The alkaloids thus obtained appear uncrystallizable. They are left, when their solutions are evaporated, in the form of a brownish varnish coating the dish. They restore the color of reddened litmus, and turn turmeric paper brown. They are soluble in alcohol and water; sparingly soluble in wood spirit

and insoluble in pure ether and chloroform. They form salts by neutralizing acids, which (the salts) are uncrystallizable and mostly deliquescent. On heating their solutions with liquor potassæ no ammonia is given, but by heating the solid alkaloids with soda lime, ammoniacal vapors were abundantly evolved. The taste of the alkaloids is slightly bitter. On igniting the solid alkaloids, each swelled up with the disengaging of an odor resembling that of burning flesh, leaving a carbonaceous residue which finally burned away without residue.

Ecbolina and its chloride exhibited the following reactions towards reagents:

Phospho-molybdic acid gave a flocculent, canary yellow precipitate.

Bichloride of mercury, a white precipitate.

Bichloride of platinum, a deep orange-colored amorphous precipitate.

Ter-chloride of gold, a light chocolate-colored amorphous precipitate.

Tannin, a whitish flocculent precipitate, soluble in alcohol.

Ioduretted iodide of potassium, a reddish-brown precipitate.

Iodo-hydrargyrate of potassium, picric acid, and ferro-cyanide of potassium, no change.

Tincture of iodine, a rusty brown precipitate.

Chlorine and ammonia caused after a time a whitish flocculent precipitate.

Bromine water, a canary-yellow precipitate.

Cyanide of potassium, a white precipitate.

In bringing the solid chloride in contact with concentrated sulphuric acid, solution was effected with effervescence, and the production of a dull blush-rose color.

Bichromate of potassa and sulphuric acid caused effervescence and solution, which ultimately turned green without intermediate play of colors.

Ferro-cyanide of potassium and sulphuric acid produced effervescence and solution, and subsequently a yellow precipitate.

Nitric acid dissolved the salt without change.

*Reactions of Ergotina and its Chloride.*

Bichloride of platinum, no precipitate.

Ter-chloride of gold, a drab-colored precipitate.

Phospho-molybdic acid, a voluminous yellowish precipitate.

Bichloride of mercury, a whitish precipitate, which is partially soluble in water.

Infusion of galls, or tannin, a whitish precipitate, and only in concentrated solutions.

On adding to the chloride in solution bi-chloride of platinum and an excess of etherized alcohol, a yellowish precipitate was obtained.

Cyanide of potassium occasioned no change.

The present investigation of ergotina and its behaviour has been less complete than its congener ecbolina, which was, in fact, owing to an accidental loss of a portion of the alkaloids.

*Physiological action of the Alkaloids.*

The experiments were made by comparison with the powdered drug. Unlike most authors, who believe that ergot has no obvious action on the male, I have come to the conclusion that it has as powerful an influence upon the spinal column of the male as it has upon the female. I find a half a grain of ecbolina to possess the same therapeutic action as thirty grains of ergot. From either the alkaloid or the powdered ergot in the doses mentioned, the following effects have been experienced upon myself:

The functions of the brain were excited to a species of intoxication, in which participated the muscular system, causing involuntary contractions of the muscles, soon followed by nausea, loss of appetite, a sense of weight and shooting pains through the head, stiffness and soreness of the muscles of the neck and extremities, a creeping sensation along the course of the spine; finally, a state of general relaxation and debility, soreness of the muscles, particularly those of the extremities, and a gnawing sensation in the stomach, with hunger. From the beginning to the end of the ergotic influence, which lasted about three hours, the pulse was not materially affected until the stage of debility supervened, when the pulse fell about four beats per minute. On doubling the dose, the only difference observed was, that the state of excitement was of shorter duration, but was followed by a greater amount of debility, greater

weakness, with trembling of the extremities and pain through the chest.

Half a grain of chloride of ecbolina was given to a strong muscular man, weighing 180 pounds, and in perfect health. He complained of shooting pains in the head, nausea, frequent calls at micturation, pain and tightness across the chest, followed by a reduction of the pulse, depression of the mind, a dull pain with a sense of pressure above the orbits, and general debility.

Experiments instituted with Ergotina in a physiological point of view were less complete, owing to the loss previously mentioned. From the effect produced upon myself, I believe it to be less active than its congener, and although capable of causing some cerebral excitement, and a reduction of the pulse, I did not observe the same specific action upon the spinal column and muscular system.

I placed into the hands of a physician some months ago a solution of chloride of ecbolina, to test its medicinal qualities in uterine hemorrhages and parturitions, but have not heard from him since.*

It must be observed that the yield of alkaloid does not correspond with the amount contained in the drug. The alkaloids are very prone to change and decomposition. On decomposing the double salt of mercury and the alkaloids with sulphide of hydrogen, quite a loss is then sustained by the formation of sulphuret of allyle at the expense of the alkaloids.

Chloride of propylamin has been obtained direct from the fractional precipitates Nos. 4, 5 and 6, by passing the solutions through prepared aurinal charcoal, until the removal of the ergotina is effected, the solutions evaporated to dryness and exhausted with hot absolute alcohol, will, on evaporation, deposit chloride of propylamin, which is readily recognized by the hexagonal form of its prisms, and when evaporated with bichloride of platinum, the octohedral yelk-colored double chloride

* Since this article was put into type the following has been received from the author:—

"I have seen the physician into whose hands I placed the chloride of ecbolina. He tells me that he used it in several cases of uterine hæmorrhage, with satisfactory results, but says that, from the symptoms produced in the doses I had directed him to give, he was compelled to lay it aside, from the energetic and poisonous action it evinced, causing great nausea with distressing vomiting and intense headache. He thinks the ecbolina to be a powerful agent."—Ed. Am. Journ. Pharm.

was deposited, which, on ignition, left a percentage of platinum agreeing with that of propylamina.

To determine the existence or non-existence of a volatile organic alkaloid, aside from propylamina, was next made the subject of investigation. An infusion of ergot, made alkaline with potassa, was distilled, and the distillate received in water acidulated with hydrochloric acid. The distillate gave no precipitate with phospho-molybdic acid and bichloride of mercury. It possessed an odor somewhat similar to that of ergot, which was not rendered more distinct by making the liquid alkaline. On heating, vapors of propylamina were given off. On evaporation, the residue consisted of discolored chloride of propylamina. It is therefore certain the propylamina is the only volatile base contained in ergot.

### ERGOTIC ACID.

A cold prepared aqueous infusion of Ergot was strongly acidulated with sulphuric acid and distilled. The distillate was nearly colorless, possessed a strong pungent odor and a decided acid reaction. It reduced proto-nitrate of mercury and nitrate of silver; when heated, alcohol and sulphuric acid. Formic ether was detected.* On heating gently the formic acid was dissipated. The acid solution was not precipitated by acetate of lead, nitrate of silver, and chloride of barium. When neutralized with ammonia, the reagents then readily formed precipitates soluble in dilute nitric acid. Chloride of barium gave a precipitate which dissolved in nitric acid, with the subsequent formation of a heavy granular precipitate which, when microscopically examined, was found to consist of colorless transparent hexagonal, and triangular plates. This baryta salt is characterized by its insolubility in concentrated nitric and hydrochloric acids. As the precipitated ergotate of baryta is dissolved by hydrochloric acid without the formation of the crystalline baryta salt, and as nitric acid alone produces that change with the evolution of some gaseous body which escapes with effervescence (not nitrous acid) during the deposition of the salt, it is possible that one atom of hy-

*To determine whether the formic acid here obtained pre-existed, or had been obtained by decomposition by the means of sulphuric acid, an infusion of the drug was distilled with tartaric acid, but with negative results.

drogen may be replaced by $NO_4$ forming a new acid, a nitro-acid. On decomposing this barytic salt carefully with sulphuric acid, the liberated acid was found to possess a stronger acid reaction than ergotic acid. It decomposes alkaline and earthy carbonates with effervescence, and forms crystallizable salts with them which ergotic acid does not. The salt of potassa crystallizes in rhombic prisms, the soda salt in cubes, and the salt of lime in oblique rhombic prisms. On evaporating a solution of ergotic acid in water, the acid volatilizes with the vaporized water.

Ergotic acid has been hitherto considered to be fungic acid. As the latter acid is not volatile and can be evaporated to a syrupy consistence without loss, I do not believe there is any foundation for it. It is true that, like fungic acid, the free ergotic acid is not precipitated by salts of baryta and silver unless they are in combination with bases.

In order to determine as near as possible the manner in which the acids and bases of ergot are combined, an infusion of the drug was evaporated to one half and filtered to separate the albuminous matter which had coagulated. It was then carefully evaporated to a syrupy consistence and mixed with 95° alcohol in large excess. The precipitate, after washing with alcohol and solution in water, was found to possess an acid reaction. On the addition of ammonia in excess, the basic phosphate of ammonia and magnesia subsided, and on adding now sulphate of magnesia, more of the precipitate fell. Potassa, ergotic acid, and the alkaloids were found, but no propylamina. It was evident that the precipitate, insoluble in alcohol, contained its constituents in the following arrangement:

Ergotates of the alkaloids,
" " potassa.
Acid phosphate of magnesia.

The alcoholic solution was evaporated to expel the alcohol and diluted with water; on adding ammonia no precipitate appeared, but adding also sulphate of magnesia, the triple phosphate at once appeared, indicating the presence of phosphoric acid. Propylamina was found, also ergotic acid, the alkaloids, potassa, chlorine and lime. It is evident that the constituents of the alcoholic extraction are thus arranged:

Ergotates of the alkaloids.
Phosphate of propylamina.
Chloride of potassium.
" " calcium.

On subjecting the solid extract of the infusion to a destructive distillation, the first part which passed over possessed an acid reaction (ergotic acid), then followed white dense vapors containing chloride of propylamina and some free ammonia. The vapors possessed the smell of burning flesh. At the moment when the white sublimate ceased, the carbonaceous residue possessed a strong acid reaction, caused by the acid phosphate. After strong ignition the acid reaction had disappeared. On exhausting the residue with boiling water, the solution contained phosphate of potassa and chloride of potassium. That portion of the carbonaceous residue insoluble in water, was treated with hot water acidulated with hydrochloric acid; analysis gave phosphate of magnesia and phosphate of lime.

This last experiment was instituted for the purpose of confirming the previous experiments. To take a summary view of this subject the following resumé may perhaps be necessary to render it sufficiently clear.

The constituents which I have found in the aqueous infusion of ergot are, according to my investigations,

Ergotate of ecbolina.
" " ergotina.
" " potassa.
Acid phosphate of magnesia.
Phosphate of propylamina.
Chloride of potassium.
" " calcium.

When the extract is heated the ergotates of the alkaloids are entirely decomposed. The acid phosphate of magnesia, in reacting upon the ergotate of potassa, fixes the potassa, setting the ergotic acid free, which sublimes. The phosphate of propylamina and chloride of potassium interchange their elements with the formation of phosphate of potassa and chloride of propylamina, the latter subliming. On ignition the chloride of calcium is decomposed, the acid phosphate also fixing the lime.

*La Crosse, Wisconsin, April 4th,* 1864.

## ON CAULOPHYLLUM THALICTROIDES, (BLUE COHOSH).

By Albert E. Ebert, of Chicago.

(An Inaugural Essay, presented to the Philadelphia College of Pharmacy, 1864.)

This plant, likewise known as Squaw root, Pappoose root, is indigenous to the United States, growing in low moist grounds near running streams, bearing berries of a dark blue color when ripe, from which it derives its name "Blue" Cohosh. The root is the part used in medicine, being principally employed by the so-called Eclectic practitioners. The root consists of a thick irregular bent or contorted body, or caudex, from a quarter of an inch to half an inch in thickness, often several inches in length and furnished with many slender radicles from four to eight inches long. The color is externally yellowish brown, internally whitish, with a light brown pith running through the centre of the root. The taste is at first sweetish bitter, but after chewing, it becomes somewhat acrid, leaving a peculiar irritant sensation on the fauces.

The root, as usually met with in the shops, comes in the pressed state from the Shakers. Not having facilities for collecting sufficient of the root for this series of experiments, I had to resort to the drug as found in the market.

A quantity was reduced to a coarse powder, and macerated 48 hours in water. The whole was then transferred to a distillatory apparatus and distilled. The distillate obtained was neutral to test-paper, not milky or fluorescent, had no perceptible odor, and but a slight taste of the root. This would indicate the absence of a volatile oil.

Another portion of the powdered root was exhausted with cold water. This infusion had a dark brown color, and the peculiar taste of the root. When first prepared, it was perfectly limpid, but soon became turbid on standing. A portion of this infusion, when agitated with a weak solution of corrosive chloride of mercury, let fall a copious precipitate.

With another portion a strong infusion of nutgalls produced a curdy precipitate, and another portion, when boiled and allowed to cool, deposited a flocculent precipitate, these tests indicating the presence of *Albumen*. A watery decoction was next prepared from the bruised root, filtered and concentrated, and precipitated,

by the addition of strong alcohol. The precipitate obtained was dissolved in water, and tested with a solution of subacetate of lead, which caused a white gelatinous deposite; another portion of this watery solution gave, on the addition of alcohol, a white precipitate, these tests indicating the presence of *Gum*. A portion of this watery decoction, when tested with an aqueous solution of iodine, produced the characteristic blue color, thus proving the presence of *Starch*. No tannic or gallic acid was detected on carefully adding the solution of gelatin and a per-salt of iron. The liquid from which the gum was separated by the addition of alcohol, was now freed from the latter by evaporating. I now added to the liquid a solution of the neutral acetate of lead. The precipitate thus produced was collected and suspended in sufficient water, and hydro-sulphuric acid in excess was passed through it. The precipitate thus thrown down was collected on a filter, and, after heating the filtrate to drive off the hydro-sulphuric acid, it was tested as follows: Chloride of barium produced a cloudiness, seeming to indicate sulphuric acid, which may have been an accidental product of the foregoing experiment. Phosphoric acid was shown by a dilute solution of nitrate of silver, producing a yellow precipitate, being again soluble in an excess of ammonia. The sulphuret of lead obtained by decomposing the just mentioned lead precipitate by hydro-sulphuric acid, was boiled with water and filtered, yielding a little colored extractive matter.

Alcohol, sp. gr. ·835, was now added to the sulphuret of lead and raised to boiling point, and filtered while hot; when shortly, on cooling, it deposited *crystals* of yellowish tint. This crystalline body was not soluble in cold water, or in water acidulated by sulphuric acid, neither in a solution of caustic potassa or soda, but was slightly soluble in cold and very soluble in boiling alcohol, also soluble in ether and chloroform. The reaction with reddened litmus paper was slightly alkaline. On heating the crystals on platina foil, they first fused, giving off vapors of water and puffed up in a spongy coal, combustion being effected without residue. The crystals when placed under the microscope, presented the prismatic crystalline form with oblique termina-

tions. The yield of the crop being very small, I was unable to pursue my investigations upon them any further.

The solution separated by filtration from the precipitate, produced by the neutral acetate of lead, was now mixed with a solution of subacetate of lead, as long as thereby any deposit was effected. This precipitate was likewise collected on a filter and washed with water. The filtrate was freed from lead contained therein by passing through the solution hydro-sulphuric acid in excess. The produced sulphuret of lead was then separated by filtration, and the hydro-sulphuric acid expelled from the filtrate by heating and evaporating to a syrupy consistence. This evaporated residue was mixed with alcohol, sp. gr. ·835, and agitated, whereby a dark brown extractive mass was separated. The alcoholic liquid, after being separated from this extractive mass, was mixed with an equal volume of ether and agitated, when again a light brownish body was separated. I tested this latter body by Trommer's test for sugar, but with a negative result. The ethereal solution yielded, on evaporating spontaneously, crystals similar to those already described.

Having used up all my stock of root in the above mentioned experiments, and being somewhat encouraged by the isolation of a crystalline body, also having found its ready solubility in boiling alcohol, I had no doubt now but that I should be able to obtain it in large enough quantities to determine its true character, but in this I was disappointed. Having procured 10lbs of the root in the pressed state, put up by the Shakers, New Lebanon, N. Y., and wishing to dry it to facilitate its reduction to powder, I observed, in garbling it, that it contained portions of a root of a yellow color, which, on close examination, proved to be the root of Hydrastis Canadensis; this existing in the proportion of about one-third of the whole quantity. Thinking that there might have been an accidental admixture I returned it, but was somewhat surprised that I could not find a single pound in the market, without more or less of this admixture. Is this accidental or intentional on the part of the parties who put up and send this mixed drug into the market? This is one of the objections to the buying and selling of herbs and roots in this pressed and wrapped condition. Through inexperience in the precaution

necessary before an analysis, I had neglected to examine the first lot of root I used, and my obtaining a crystalline body in the before-mentioned experiments may have been due to this mixture of the two roots, as in all my succeeding experiments, with a pure picked root, I have been unable to obtain this crystalline body.

*Experiments with the picked Root.*

A portion of the finely powdered root was exhausted with boiling alcohol, sp. gr. ·835. The tincture thus obtained was evaporated by means of a water-bath to a syrupy consistence; a small quantity of alcohol, sp. gr. ·815, was added, and this solution poured into a large bulk of water. This admixture caused a precipitate, which was collected on a filter, well washed with water and dried, yielding nearly five troy ounces from forty-two troy-ounces of the root. This constitutes the *Caulophyllin* of the eclectics. A portion of this, dried and powdered, was agitated with ether, the insoluble portion separated by filtration, and re-dissolved in alcohol, sp. gr. ·835. The alcoholic solution thus obtained was agitated with purified animal charcoal, filtered, and allowed to evaporate spontaneously. The resin thus obtained was of a light brown color, soluble in alkaline solutions, from which it was precipitated on the addition of acids. When heated on platina foil it first was found to melt, then to take fire and burn, emitting considerable smoke. This indicates a *resin insoluble in ether*. The ethereal solution, on being subjected to spontaneous evaporation, yielded a resinous body of a greenish yellow color, and of the consistency of wax, soluble in alkaline solutions, and precipitated on the addition of acids. Another portion of this ethereal solution was agitated with animal charcoal until it became colorless. After filtering and evaporating spontaneously it yielded the same resinous, waxy body as above mentioned, with the exception of being nearly white with a yellowish tinge; both these bodies when heated burn, emitting considerable smoke. This would prove the presence of a *resin soluble in ether*. Both the alcoholic and ethereal resins have the peculiar taste of the root. On evaporating the watery liquid from which the resinous bodies were precipitated, it yielded an extractive body of a bitter and acrid taste, similar to that caused by chew-

ing the root, soluble in alcohol and water; when shaken with the latter it produced a very thick and persistent froth. This led me to investigate it with reference to the presence of a body analogous to saponin. I dissolved this extractive body in diluted alcohol, and passed it through animal charcoal; this liquid, when agitated with ether, let fall a fawn-colored precipitate. The liquid was decanted, the precipitate was washed and dried, yielding, when powdered, a grayish white inodorous body, very irritant to the nostrils, producing sneezing. The taste is sweetish acrid bitter, leaving a tingling sensation in the mouth and fauces. It is entirely dissipated on the application of red heat.

This substance is freely soluble in diluted and strong alcohol, also freely soluble in hot water, with which it produces a very thick froth on agitation. Its aqueous solution reddens litmus paper. It is soluble in alkaline solutions, as of ammonia, potassa and soda. It is precipitated from its watery solution both by neutral and subacetate of lead; by the former a light, and by the latter a dense flocculent precipitate; with a solution of binitrate of mercury, and also, with a solution of terchloride of gold a slight precipitate. When heated with sulphuric acid it first assumes a rose, then a purple, and finally a violet color. On heating with nitric acid, it assumes a straw-yellow color, and on the addition of water, a flocculent matter separates and rises to the top. When heated with hydrochloric acid it is not altered in color, simply depositing a flocculent precipitate, which, when added to boiling water, is but partially soluble, this again being deposited on cooling. From these experiments it appears that this root contains a substance similar to *Saponin*.

While making the above series of experiments, my attention was called to a paper by Prof. Ferdinand F. Mayer, published in the March number of the *American Journal of Pharmacy*, 1863, wherein he says, "that if the alcoholic tincture of this rhizoma was left to spontaneous evaporation, a deposit of a white granular substance was obtained. This deposit, when washed with diluted acid, dissolved a colorless alkaloid and soluble extractive, and then with some water remains as a grayish white powder, which, for the greater part consists of *Saponin*."

I do not assume to contradict Prof. Mayer, although, while

fully corroborating his statement in regard to a body analogous to saponin, I was wholly unable to obtain a crystalline body when manipulating with the greatest care with a pure article of the root; and it is possible that Prof. Mayer, like myself, was deceived by employing an impure sample of the drug. Having made a watery decoction of six pounds of the root, I evaporated this to an extractive consistence, and extracted this with boiling alcohol, sp. gr. ·835. This was freed from the alcohol by vaporization, and again dissolved in sufficient water, and the following processes for alkaloids were tried. The process with acetate and subacetate of lead, that with oxide of lead, with lime, and with magnesia, in neither case could I obtain a crystalline body by carefully following the processes laid down.

*Inorganic Constituents.*

Eight hundred grains of the root when incinerated, yielded twenty grains of a light colored ash.

A portion of this ash was treated with boiling water; the solution was filtered and tartaric acid added in excess, when a white crystalline precipitate of bitartrate of potassa was obtained.

Another portion of the solution, when tested with nitrate of silver, produced a curdy white precipitate, which blackened on exposure to light and which was entirely soluble in aqua ammonia, proving the presence of a chloride.

Another portion of the solution gave, with chloride of barium, a white precipitate, which was not soluble in boiling nitric acid, proving the presence of sulphuric acid. The insoluble portion of the ash was treated with hydrochloric acid, in which it was partly soluble. A portion of this acid solution, gave, with ferrocyanide of potassium, a blue color, indicating the presence of a salt of sesquioxide of iron.

On the addition of phosphate of soda and ammonia to another portion, a white precipitate was obtained, indicating the presence of magnesia.

Another portion of the acid solution, when neutralized with ammonia, gave, with a solution of sulphate of magnesia, a white precipitate, this being again soluble in nitric acid, proving the presence of phosphoric acid.

With the remainder of the solution, oxalate of ammonia produced a white precipitate, thus indicating the presence of *lime*. The insoluble portion of the ash was well washed with distilled water and then boiled with a solution of potassa; it was then filtered, and yielded, on the addition of diluted acids, a white precipitate, which on drying, was found to be insoluble in water and diluted acids, thus indicating the presence of *Silica*.

From the foregoing experiments, the organic constituents of the root of Caulophyllum thalictroides are: 1st, Albumen; 2d, Gum; 3d, Starch; 4th, Phosphoric acid; 5th, Extractive; 6th, Resin, soluble in alcohol and insoluble in ether; 7th, Resin, soluble in alcohol and ether; 8th, greenish yellow coloring matter; 9th, a body analogous to *saponin*.

The inorganic constituents are: Salts of potassa, magnesia, lime, iron, and silica.

*Philadelphia, February*, 1864.

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## REMARKS ON SOME PREPARATIONS OF THE U. S. PHARMACOPŒIA, 1860.

By William Procter, Jr.

This work has now been in the hands of American pharmaceutists for many months and it is presumed that every pharmaceutist, who makes an effort to keep up with the progress of his art, has more or less informed himself of its contents. On a former occasion it was hinted that notices of some of the preparations would be brought forward, from time to time, and it is now proposed to begin them. Every Apothecary should carefully read and fix in his memory the important preliminary notices which refer to weights, measures, temperature, percolation and powders. Indeed so highly important is it to fully comprehend the theory of the *process of extraction by percolation*, as it is intended by the framers of the Pharmacopœia, and to skilfully apply the principles involved in practice, that percolation, and the preparation of powders it requires, may be considered as the fundamental processes of galenical pharmacy. The beginner should follow closely the directions of the Pharmacopœia, whatever may be his preconceived notions, bearing in

mind that it is only on this condition that the formulas of the work can be fairly tested and their merit determined.

ACETA.—*Acetum Lobeliæ.* The first notice of this preparation will be found at page 109, vol. 14th, of this Journal, July 1842; as there suggested the proportion is four ounces to a pint and a half. In the Pharmacopœia it is made four ounces to two pints, to correspond with the vinegars of Blood-root and of Squills. It is a dark reddish-brown liquid with an acidulous acrid taste. The lobelia is directed to be in moderately coarse powder, which, if uniformly prepared, is the most appropriate degree of division for the menstruum used.

*Acetum Sanguinariæ.* Vinegar of Blood-root has long been known as an unofficinal popular preparation for ringworm, especially when a portion of verdigris is dissolved in it. The first notice of it in this Journal, is as a basis for Syrup of Sanguinaria by T. S. Wiegand, at page 108, vol. 26th, which preparation is in the ratio of 4 ounces to the pint. As prepared by the Pharmacopœia it is two troy ounces to the pint of diluted acetic acid, and has at first a deep red color which becomes lighter on standing, owing to the deposition of coloring matter, which appears to be independent of that due to the acetate of sanguinarina.

*Acidum Hydriodicum Dilutum.* In this process hydrosulphuric acid gas is passed through a mixture of powdered iodine and water, until a clear solution is obtained. The direction to treat thirty grains of iodine separately is to afford the means of getting the iodine into solution by aid of a portion of hydriodic acid. When this is not done, the sulphur, which, as it cedes its hydrogen to the iodine, separates at first as a powder, assumes the form of lumps, enclosing portions of the undissolved iodine, which are either overlooked or require to be liberated by breaking down the lumps of sulphur.

The officinal solution, though colorless when recent, becomes brown, from escape of hydrogen and the formation of hydriodous acid, by keeping in contact with the air. Iodine is gradually deposited in crystals, hence the solution, immediately after being made and yet warm, should be introduced in bottles which it nearly fills and securely closed.

*Diluted nitro-muriatic acid.* The object of this preparation is to facilitate the dispensing and administration of the acid, which in its undiluted state has been the cause of unpleasant accidents, from the sudden escape of enclosed chlorine, when the bottles are opened for use. The necessity of retaining the undiluted acid is not very apparent, unless it had been used as a step in the process for the diluted acid, which it has not.

*Acidum Phosphoricum Dilutum.* This process, which is analogous to that of the late London Pharmacopœia, in its results differs in the apparatus used, and is essentially the process of Messrs. Andrews & Thompson, of Baltimore, published in the Maryland Journal and Transactions, for Sept. 1, 1858, and republished in this Journal, vol. xxx, page 525. The merit of the process consists in the use of a porcelain capsule, in lieu of a glass retort. The inverted dish, recommended by Messrs. A. & T., is very properly substituted by a glass funnel in the officinal process, which, while equally safe, renders the process observable, and in fact converts the capsule, for the time, into a glass matrass.

In the second process, wherein the solution is made from glacial phosphoric acid, the addition of nitric acid is to facilitate the conversion of the glacial into tribasic phosphoric acid, as recommended by Mr. Maisch, (see vol. xxxiii. page 385, of Amer. Jour. Pharm.) and which is much more slowly effected by ebullition alone.

*The Diluted Mineral Acids.* It will be observed that the strength of the diluted muriatic, nitric and sulphuric acids, has been somewhat changed; all of them are slightly weakened. The change in strength was caused by employing weight instead of measure for the acids, and by making each process yield just a pint. According to Mr. A. B. Taylor, the ratio of the old and new diluted acids is as follows:

| | Ph. 1850. | Ph. 1860. |
|---|---|---|
| Diluted muriatic acid, | 2114 grs. | 1920 grs. per pint. |
| Diluted nitric acid, | 1479 " | 1440 " " " |

Diluted Sulphuric acid, ratio not stated but nearly equal.

*Acidum Sulphurosum.* This formula, which is nearly that in Wittstein's Pharmaceutical Chemistry, I have frequently

employed and found to be practicable, and easily conducted in the shop on the scale of the Pharmacopœia. All that is needful is to have the luting tight to prevent the annoyance arising from the escape of the gas. Common putty will answer for all the joints except that at the matrass, which should be made of linseed meal and water, unless the cork is very close, which is not always the case, under pressure.

Aqueous Sulphurous Acid thus prepared should be introduced into the bottles, so as to nearly fill them, and secured by sealing wax. The direction to keep in a cool place is needful on account of expansion. I have found no difficulty in keeping it for six months in bottles with corks well sealed, but access of air results in the escape of some of the gas, and the conversion of the remainder into sulphuric acid. In the Pharmacopœia note to this preparation the last sentence refers to this tendency to change into sulphuric acid, which would be detected by the test.

*Acidum Valerianicum.* The process for this acid is that of Benjamin J. Crew, published originally in the Amer. Jour. Pharm., vol. xxxii. page 109, in describing his process for obtaining crystallized valerianate of ammonia. The manipulation is based upon the facts that concentrated valerianic acid is insoluble in a saturated solution of sulphate of soda, and in strong sulphuric acid, which, on the contrary, abstracts from it a part of the water present. In the subsequent distillation the aqueous portion comes over first and is rejected, or after dehydration by $SO_3$ is again returned to the retort.

The only pharmacopœial use of this acid is in the preparation of the valerianates of ammonia and quinia, but there is no doubt it will become useful for the preparation of other salts, as that of morphia, and that it will be used in a free state in mixtures. It is probable that commercial valerianic acid is often contaminated with substances derived from the fusel oil from which it is produced, but care in its preparation will avoid this fault. I am not aware that the physiological and therapeutic action of free valerianic acid has been specially studied though it seems worthy of attention.

(To be continued.)

## GLEANINGS FROM THE FOREIGN JOURNALS.

*Opiated Syrup of Lactucarium.* In a paper published in *Jour. de chimie médicale*, Jan., 1864, M. Aubergier, among other information in regard to syrup of lactucarium, gives the following recipe for a syrup of opium and lactucarium under the title "*Sirop de Lactucarium opiacé.*"

| | | |
|---|---|---|
| Take of Alcoholic extract of Lactucarium, | 150 centigrs. | (23 grs.) |
| Extract of Opium | 75 " | (11·5 grs.) |
| White Sugar, No. 1, | 2000 grms. | (64 troy oz.) |
| Orange flower water, | 40 " | (10 drs.) |
| Distilled water, | 9·05 | (2½ drs.) |
| Citric acid, | 75 centigrs. | (11 ½ grs.) |

Dissolve the extract of opium in the orange-flower water and filter. On the other hand exhaust the alcoholic extract of lactucarium with the distilled water boiling, allow it to cool and filter through paper. Dissolve the sugar in the latter solution and sufficient water (34 fd. ozs.) to make a syrup, with the aid of heat, add the citric acid and clarify with white of egg, removing the scums as they arise, evaporate to 30° B., boiling then again; evaporate the syrup until it loses as much weight as equals the solution of extract of opium, which is then added and the syrup strained.

Each spoonful of this syrup contains the part soluble in water of one centigramme ($\frac{1}{6}$th gr.) of extract of lactucarium, and half a centigramme ($\frac{1}{12}$th gr.) of extract of opium.

*Emulsion of Pumpkin seed and Male ferm for Tænia.*

| | | |
|---|---|---|
| Take of Pumpkin seed, | 40 grammes | (617 grains. ) |
| Sugar, | 30 " | (416 " ) |
| Oleo resin of male ferm | 4 to 8 " | (61 to 122 grs.) |
| Water, | 150 " | (5 fluidounces. ) |

Bruise the seed in a marble mortar, with a fourth part of the sugar, add about half a fluidounce of water and, when a homogeneous paste is obtained, add the oleoresin, mix and dilute gradually with the remainder of the vehicle. This emulsion should not be strained, and when the preparation has been well made, that is to say when the seed have been thoroughly bruised, the patient can take the emulsion without difficulty.

This potion should be taken early in the morning, at four

times, at intervals of a quarter of an hour. The only precaution recommended is to shake the vial each time it is used.—*Bull. Thérap. et Jour. de Chim. Med.*

*Mercurialia.* According to M. Reichardt, when the leaves or seed of *Mercurialis annua* are submitted to distillation, with an excess of quick lime, a volatile alkaloid, having a disagreeable odor, is disengaged. The vapors are collected in a receiver containing diluted sulphuric acid and the liquid evaporated on a water-bath, by which a residue is obtained, consisting of sulphate of ammonia, brown, resinous, matter, and a salt of an alkaloid base, which the author has named *mercurialin.*

The whole residue is extracted with absolute alcohol, which dissolves only the new sulphate, after driving off the alcohol the sulphate is distilled with caustic potassa; the product is ammoniacal, which is rectified in a current of hydrogen on a chloride of calcium bath, when the new alkaloid is obtained in the state of an oily liquid which is deprived of adherent ammonia by the vacuum.

This alkaloid is very poisonous; it has not been analysed. Its characters are as follows: an oily liquid of a disagreeable odor and an alkaloid reaction, transformed by the action of the air into a resin of butyraceous consistence. Its boiling point is 284° F. It absorbs carbonic acid and yields a carbonate very soluble in alcohol.

The chloride is also soluble in alcohol; the bichloride of platina precipitates it, only after a time, in the presence of strong alcohol and in nacreous crystals. The oxalate is very soluble in water and much less so in alcohol.

Mercurialia is very hygroscopic, and by becoming hydrated loses some of its disagreeable odor.—*Jour. de Chim. Médicale.*

*Aniline in Varnishes.* When an alcoholic solution of aniline is evaporated upon a glass plate, there remains a thin transparent coating of aniline, which, by reflected light, appears as a metallic green iridescence, but by transmitted light of a blue or violet color, according to the shade of aniline used. As aniline is soluble also in spirit varnishes, it is proposed to prepare such a blue transparent varnish for coating bottles, used for the preparation of substances easily affected by light.—*N. Jahrb. Ph.* xx. 44.

## ON THE ACTIVE PRINCIPLES OF THE STRYCHNACEÆ.

By Ferdinand F. Mayer, of New York.

In taking up this subject various points have presented themselves for consideration, several of which are to be mentioned now, while others must necessarily, and by our leave, remain over for future consideration. I have thought it best to confine myself at present to some remarks on the knowledge we possess of the active principles of the Strychnaceæ; then, as to their quantitative determination pure, and in the preparations officinal in the U. S. Pharmacopœia; and though leaving the subject incomplete, these contributions are submitted as answering the main points contained in the query.

The literature, medicinal, pharmaceutical, and chemical, of the drugs derived from this family, is by no means as extensive as that of opium and of bark, nor is our knowledge of their active principles as accurate as might be expected or desired.

These active principles are supposed to be represented by two or three alkaloids, which, named in the order of discovery, are strychnia, brucia and igasuria. Pelletier and Caventou, in 1818, discovered in the Ignatia seed a bitter alkaloid which they named *Vauqueline*, in honor of the great pharmaceutist; this name Bucher, sen., considered inappropriate, and proposed in place of it, *Strychnin*, which it thenceforth retained; *Tetanin* was suggested for it by Magendie. Pelletier and Caventou likewise found this alkaloid in nux vomica and bois de couleuvre, snakewood, lignum colubrinum from Strychnos colubrinum. Shortly after they noticed the existence of a different alkaloid in the bark of *Strychnos nux vomica*, then known as false angustura bark, and supposed to be that of *Brucea anti-dysenterica*; hence its name of Brucia, in place of which, Geiger once proposed Caniramin (*canis*, dog, *ira*, rage.) Desnoix, lastly, noticed a crystalline deposite in the alkaline liquor from which strychnia and brucia had been precipitated, and called the same *Igasurin*. Schützenberger afterwards confirmed that this alkaloid concurred in many properties with brucia, but found it was itself a mixture of no less than nine different bases, varying slightly in the per centage of carbon, hydrogen and oxygen, and water of crystalli-

sation, as well as in solubility; the same chemist had before noticed similar variations in the composition of strychnia. It is readily perceived, from the properties ascribed to strychnia especially, and brucia, by Pelletier and Caventou, Pettenkofer, Geiger and Merck, that these chemists operated with mixtures of the alkaloids. For this reason statements as to the quantity of the respective alkaloids to be found in either nux vomica or ignatia seed, made previous to Wittstock, are not to be relied on. The latter observer states that 10 ounces of nux vomica yield 12½ grains of strychnia and 31¼ of brucia, while according to Gieseler, 10 ounces of ignatia seed yield 72 grains of strychnia. Pelletier and Henry obtained between 40 and 50 grains of this impure strychnia from 10 ounces of nux vomica.

These discrepancies find their explanation in the peculiar character of that portion of the alkaloids which is not readily precipitated by alkalies.

The alkaloid which received the name of strychnia is recorded as scarcely soluble in water and alkalies. Planta, whose observations will in most cases be found at least as trustworthy as those of others who are much more frequently quoted, never uses the expression "insoluble," in such cases, but says *not perceptibly soluble*, and this, as a matter of course, is the case with all alkaloids, since none of them are ever completely insoluble in water or completely precipitated by alkalies proper. Brucia was called originally the precipitate which falls down from mother liquors of crystallisations of strychnia by the addition of more soluble alkali, and igasuria that which finally deposited from the alkaline solution on standing. With the exception of Planta, who mentions the difficulty with which brucia is precipitated by ammonia, I find on record but one instance in which the circumstance is mentioned which enables me, without entering more closely into a consideration of the subject, to give a rapid as well as accurate method for determining strychnia in the presence of the other alkaloids; it is this, in a paper published by that excellent chemist, Dr. F. L. Winckler, of Darmstadt, in 1835, Repertorium f. de Pharmacie. Bd. li. p. 369, wherein he mentions the solubility of brucia in ammonia and caustic alkalies and

earths, and determines the quantity of brucia in the alkaline mother liquor from the precipitation of strychnia by acidulating and then precipitating it with corrosive sublimate.

It might be supposed that, as this solubility is considered a characteristic of igasuria solely, this alkaloid or mixture of alkaloids was identical with brucia, and that there were in fact but two alkaloids present in the plants of one family. But there is a considerble degree in this solubility; a portion of the dissolved alkaloid crystallises out, while the remainder, which however forms a crystalline salt with oxalic acid, is held indefinitely long in solution.

Strychnia itself is, to some extent, soluble in alkaline liquids. As the proper alkali for experiments and assays of this kind, I have long since used and lately recommended in a particular instance, crystallised caustic baryta, which, in my opinion, cannot be surpassed by any other substance of this class. My remarks in this connection have therefore exclusive reference to precipitation and solution by means of caustic baryta.

One hundred c. c. of a solution of baryta at 60°F. dissolve 0·036 of a gramme, or 0·55 of a grain of strychnia.

One hundred c.c of the same solution of baryta dissolve as a minimum 0·5 grammes, or nearly 8 grains of brucia.

In determining the strength of a preparation from a drug containing these alkaloids, it is only necessary to know the quantity of a reagent required for the sum of the alkaloids, to precipitate a known portion of the solution made from the preparation by baryta, and to dilute the alkaline liquor to a certain strength sufficient to hold in solution all the brucia which may be present.

A gramme of pure strychnia requires for precipitation 59·88 c. c. of 1-10th normal solution of iodide of mercury, provided the strength of the solution does not exceed ½ of one per cent. The precipitate produced differs in its composition from that yielded by other alkaloids, inasmuch as it contains 2 eq. of mercuric iodide to one of hydriodate of the alkaloid. The quantity of 1-10th normal silver solution equivalent to 59·88 c. c. of mercury solution is 239.52 c.c.; of the 8 equivalents of iodine and chlorine contained in the 59·88 c. c. mercurial solution, 3 of

iodine or $\frac{3}{8}$ are absorbed by the alkaloid, and there is consequently a deficiency of $\frac{3}{8}$ of the number of cubic-centimetres of the silver solution; i. e., to precipitate the filtrate from the mercurial precipitate of 1 gramme of strychnia, only 149·7 c. c. of silver solution are required.

A gramme of pure brucia requires 42·9 c. c. of mercurial solution, and the composition of the precipitate is analogous to that of the strychnia compound, and to that of the combinations of mercuric *chloride* with strychnia and brucia. It is also necessary that the brucia solution be dilute and contain no more than $\frac{1}{2}$ per cent. but rather less of the alkaloid. In this case there will consequently be a deficiency of 64·35 c. c. of silver.

Of the troy weight solution of iodide of mercury, containing 16 and 2-9th grains of corrosive sublimate and 60 grains of iodide of potassium in $12\frac{1}{2}$ troy-ounces, every 10 grains correspond to 0·0334 of a grain of strychnia, and 0·0466 of a grain of crystallised brucia.

With these data the subjoined assays have been made, exhibiting the relative strength of the officinal preparations from nux vomica and ignatia seed, and the proportion of strychnia and the alkaloids soluble in water and alkalies, which I have classed as brucia.

I. *Six ounces powdered Nux Vomica exhausted by displacement with* 80 *per cent. alcohol.*

The tincture was evaporated on the water-bath with a little hydrochloric acid to the consistence of mellago. While still warm, it was mixed with 50 c. c. of cold water, and the fatty substances allowed to separate by standing; the whole was then filtered, and with the washings diluted to 100 c. c.

20 c. c. of these required for precipitation 21·5 c. c. of mercurial solution; the 100 c. c., or 6 ounces, therefore 107·5 c.c Hg.

20 c.c. were then given in a 75 c.c flask, diluted with water to 75 c.c., and then shaken with crystallized caustic baryta in excess. After filtering the alkaline solution, 40 c.c. of it was acidulated with hydrochloric acid, and then precipitated by the mercurial solution; they required 10.3 c.c., or 19·3 for the 75 c.c.—20 c.c original solution. These 75 c.c. hold in solution strychnia

equivalent to 1·63 c.c. mercurial solution, which deducted from 19·3, leaves 17.67 c.c as the equivalent of brucia, or 88·35 c.c. in the 6 ounces. The latter number deducted from the original 107·5 c.c leaves 19·15 c.c as the equivalent of strychnia.

The 6 ounces of nux vomica, exhausted by alcohol of 80 per cent., therefore contain

31·75 grains of Brucia.
4.69 " Strychnia.

II. *Six ounces of the same powdered nux vomica exhausted with boiling alcohol of* 80 *per cent., acidulated with hydrochloric acid.*

The tincture from this was treated in precisely the same manner. The fatty substance contained more fluid oil.

They were found to contain

26·7 grains of Brucia.
8·57 " Strychnia.

III. *Tincture of Nux Vomica.*

225 c.c. contain 2.93 grains of Strychnia.
19.5 " Brucia.

IV. *Extract of Nux Vomica.* 5 grammes
Contain 2·46 grains of Strychnia.
7·75 " Brucia.

V. *Extract of Nux Vomica* (Ph. Boruss.) 4·6 grammes
Contain 0·7715 grains of Strychnia.
13·1155 " Brucia.

VI. *Semen Ignatiæ.* 2 ounces displaced with alcohol (80 p. c.)
Yielded 4·93 grains of Strychnia.
9·86 " Brucia.

VII. *Semen Ignatiæ*, (the same.) Two ounces extracted with alcohol and hydrochloric acid
Yielded 4·5 grains of Strychnia.
13.73 " Brucia.

VIII. *Extract: Ignatiæ Alcohol:* 8·15 grammes
Yielded 4·93 grains of Strychnia.
8·42 " Brucia.

*Proceed. Amer. Pharm. Assoc.*, 1863.

## ON ÆSTHETICAL PHARMACY.

By Frederick Stearns.

The graduate, while versed in theoretical and practical pharmacy, as taught in the schools, is left to chance circumstances in acquiring that knowledge and those habits which a proper preliminary understanding of the commercial, ethical and æsthetical elements of education would endow him, and upon which his professional position in the community, and his pecuniary success, in no small degree depend.

Commercial education, as applied to the tyro in our trade, is a subject fit to enlarge upon by itself. Ethical education Mr. Parrish gave some valuable hints upon, in a paper some years ago presented to the Association.

Æsthetical education, a department worthy of considerable elaboration, is one upon which I propose to offer the following.

When we reflect how naturally the uninformed public judges men—business men—by external appearances, it is obvious that the cultivation of good taste, and an appreciative sense of the beautiful, should be no unimportant element in pharmaceutical education, and upon the proper exercise of which, pecuniary success, and good social position are to a certain extent the direct results.

From ignorance of æsthetics, as relating to our art, many never reach that position in the public eye which their real talents should command, and of which, perhaps, others really less worthy in every other sense may rob them.

I hold that, as a business man, the pharmaceutist is entitled to the benefits of all legitimate methods of enriching himself; that he is not altogether to be considered the self-sacrificing conservator of public health, a pattern of meek benevolence, or bound to hold his light continually under a bushel for fear of violating professional modesty; and because the quack pharmaceutist may, without much real merit or character, by shrewd business tact, and the careful consideration of the æsthetical in winning public favor, gain success, it does not follow that the really scientifically educated pharmaceutist may not cultivate those same habits of good taste, as an addition to his more solid acquirements.

Æsthetical laws apply to the ornamentation and convenient arrangement of our stores and laboratories, to the display of our wares, and, above all, to the general management of business, the careful elaboration of which tends beside to refine the man, to develop the more genial qualities of human nature, the social courtesies that help to place him among gentlemen, and to add dignity to his chosen profession.

The customer most indifferent to the skilful, scientific details of the labors of a dispenser, will notice and commend the simple elegance of a package nicely wrapped, or a bottle neatly finished, and from such the inference is apt that, where elegance is *constitutional*, and neatness *chronic*, there skill lives!

The fittings and the furniture of a dispensing pharmacy afford an opportunity to study and apply æsthetic rules, more so to my mind, than in the ornamentation of any other place of business.

It is a matter of some moment how to combine usefulness and elegance in such fittings, and we find too many examples of proprietors who, actuated by the laudable desire of having their premises unique or original, violate the simplest æsthetical rules by over-doing and over-crowding, or else carry their designs into the fantastic and absurd.

The following may be an approximation to the true æsthetic idea in such matters.

In those portions of the permanent fixtures of a store comprised in shelving, cornices, drawers, counters, casing, etc., where capital is limited, employ straight lines; classical mouldings, few and simple if made in cheap woods, white only in such wood; do not strive to imitate oak, rosewood, or mahogony with paint. When greater expenditure is allowable, the same general rules carried out in real fine woods, or further yet, the working of the cornices in bold arches or curves and projections, the employment of carvings not too elaborate, panel work, brackets, etc., serve to display the liberality of a proprietor within æsthetic rule.

I should designate that style of ornamentation where gilded mouldings, and the profuse employment of embossed stucco work prevails, as the "Steamboat style," as vulgar as it is unreal. The great improvement made of late years in glass shop furni-

ture, in quality of material, and simple beauty of form, leaves hardly more to be desired,

My idea is, a few good bottles rather than many cheap ones; nor should shelving be cumbered with glass or porcelain jars for ornament merely.

The shop label has been the subject of endless changes, until now the elegance of some of the forms is only matched by brilliancy and durability where glass and porcelain are used. At the prescription counter, a happy adaptation of means to ends should be studied, in the conveniences of it; the dispensing bottles small, in order to be in sufficient numbers; the various necessary appliances near at hand; no room lost in it or under it.

I doubt whether the usual practice of surrounding the top of the prescription counter with a close rail or case to free the operator from external observation while at work, compensates for the careless habits it may lead to, and the dirt corner it affords; better a rather high counter, marble top perfectly open, serving to display skilful and graceful manipulatory work, and clean utensils, for these are æsthetic. Arrange the position of drawers and shop bottles with reference to the principal working centre, or scale of the shop; that is, having those articles most used nearest to it, not by any arbitrary alphabetical rule, for the first aids the rapid dispatch of business, and the last is surely no stimulus to memory. Do not paper walls, for no matter how nicely done, it has a cheap look; better a pure white, even with white fixtures; it is a fine offset to dark ones.

In fresco or calcimine ornamentation use soft colors, no strong, exciting ones; by exciting ones I mean such high bright ones as will produce upon the eye of an excitable person the same effect, comparatively, that the red cloth does on the bull. Above all, do not allow your ambitious fresco artist to crowd impossible flowers or fantastic scroll work into impossible places: simple panel work in delicate tints is to be preferred.

If you cannot afford marble or tile for flooring, cover it with something, if nothing better than rugget, or oil cloth: in the latter choose the stone, or tile colors and design—not the flower patterns.

There is one class of fixtures you can hardly over-crowd a store with; that is good show casing, either flat or upright. As now made, in metallic frames and fine plate glass, they are in good taste almost everywhere. Serve to display goods to the best possible advantage; afford the means of developing the artistic gracefulness of grouping goods which may exist in assistants, and which again are economical; for I have always found that goods well displayed, in a great measure sell themselves.

Show windows, open, fine quality of glass, and always clean. Show bottles, few, but choice; colors, rare and light. Do not crowd a window with goods; rather let the front be as a showcase lid, to show a nicly arranged store within.

The foregoing, relating to permanent fixtures, are mere skeleton ideas, which can, of course, be elaborated in a variety of ways, all within æsthetical rules, and due regard to harmony of arrangement and general design.

A still richer field for the organization and operation of æsthetical rules lies in the every day labors, and in all the manipulations of the store, where everything done, or every item dispensed, is to teach by its neatness, nicety, simplicity, elegance, or beauty, a lesson to your customer in the science of the beautiful.

Æsthetical should be your choice of dispensing glass, in form, quality, and finish; of twines, of corks, of powder, or wrapping paper—these last in reference to color, cutting and shape.

Elegant in appearance should be all medicinal preparations; your syrups, tinctures, wines. etc., clear, clean and bright, and never dispensed otherwise.

The manipulatory hand work at the prescription counter should be not only well, but neatly and gracefully done. I consider the perfect mixing of a pill mass, the brightness of a solution or lotion, the evenness of consistence of an ointment, etc., etc., all so perfect as to exhibit skill and labor as bordering upon the æsthetic.

And, again, in externals: powders, equally folded in fair paper nicely cut, enveloped or boxed, a perfect fit; pills carefully finished, coated or powdered, boxed in nice shapes; the ointment jar or gallipot of a nice quality, covered, and of convenient

sizes and shapes; dispensing bottles of various kinds, of better qualities and selected finish; and so with corks and seals.

These and a hundred other excellencies in dispensing, must be developed by acquired experience in æsthetic rules.

Then, again, labels. Nowhere in Pharmacy can greater good or bad taste be shown than in dispensing labels; few even of printers or engravers can make a passable one. In my own experience I have met with but one real genius who, as a "typo," understood the harmonious relations of type so as to make a really elegant label; while engravers and lithographers, who are not compelled to submit to the arbitrary forms of type in arranging the form or contents of a label, produce but little choice work.

It is almost impossible to offer suggestions as to how they should be done. Experience is the best teacher, aided by the comparison of those used by competing pharmaceutists. My idea is that in labels simplicity of form and borders, terseness of wording, truth in explaining merits or composition of material, plain directions, fine quality of paper and ink, and good press-work, should all be looked to.

The manner of holding a graduate, of handling a spatula, of rolling a pestle, of corking a bottle, of wrapping it, of tying a package, of handing it to a customer, of taking and paying change, can all be benefitted by a touch of the æsthetic.

In the introduction of specialities and their putting up, is a fruitful field of æsthetic taste. Doubtless, most of my confreres of the Association have studied and reflected upon this subject themselves, and to those only who may not have done so, and to the beginner in business life, does the subject apply.

So on, by earnestly and carefully feeling the way along, day by day, one may find continually new methods and new ways of cultivating the beautiful in the details of laboratory and shop, and in general management of business.

*Detroit, Sep.* 1*st*, 1863.

*Proceed. Amer. Pharm. Assoc.*, 1863.

## AN ALKALOID IN LYCIUM BARBARUM, L. (SOLANACEÆ).

By Drs. Husemann and W. Marmé.*

The fact that nearly every genus of the family of Solanaceæ is known to yield a peculiar alkaloid, led us to examine with this view a plant very generally cultivated for ornamental purposes, and as a shading climber, and in many instances found growing spontaneous,—*Lycium barbarum*—the matrimony vine. Prominent physiological effects have so far not been ascribed to this or other species of Lycium, and only very moderate use is made of them in medicine. The fruit and leaves of *L. Chinense*, Mill., which is closely allied to *L. barbarum*, have been employed for various affections in the form of infusion; the leaves of *L. umbrosum* are used in Columbia in rash. The young shoots of *L. Europæum* are known to exert some action on alvine and urinary discharges, while the leaves of *L. afrum* are now and then given for erysipelas and lichens. The young leaves and tops of the latter species are even eaten as a kind of salad in Spain, and the berries of *L. humile* are likewise consumed in Chili.

We have examined the leaves and stalks of *L. barbarum*, each separately. Having commenced with, and used in succession, all known methods for eliminating volatile, as well as non-volatile, vegetable bases, but without arriving at any positive result, we took up as a last resource the process introduced by Sonnenschein (*American Journ. Pharm.* vol. xxx. p. 550) for the separation of poisonous alkaloids from human remains in forensic cases, and which is founded on their precipitation by means of phosphomolybdate of soda. With the aid of this reagent we succeeded in extracting both from the leaves and stalks a solid base, possessing all essential properties of the alkaloids, and which we have named *lycina* (lycin). It differs from all known solid vegetable bases by the remarkable readiness with which it dissolves, so as to deliquesce within a few minutes when exposed to the air; this fact explains the difficulties we met with in its extraction by any other method.

The largest yield was obtained from the leaves; owing to the preponderance of the woody portion the product extracted from the stalks was much less, though the liber must be considered to

* Translated for this Journal by Prof. Mayer, of New York.

be rich in the alkaloid. The decoctions obtained by boiling the parts properly comminuted in repeated portions of water, and which were pretty dark-colored, were precipitated by subacetate of lead. The copious lemon-colored precipitate was separated from the liquor by decantation, and the latter, after being freed from excess of lead by means of sulphuric acid and again neutralized with soda, was evaporated to one-third of its original bulk. It was then again strongly acidulated with sulphuric acid and completely precipitated by phosphomolybdate of soda. As we had to use large quantities of this reagent, we prepared it, not according to the method directed by Sonnenschein, but by simply dissolving 30 equivalents of molybdic acid in a solution of the corresponding quantity of caustic soda, adding afterwards an aqueous solution of one equivalent of phosphate of soda. The pale yellow colored, flocculent precipitate deposits very readily, and can then be washed with water acidulated with sulphuric acid without undergoing any perceptible decomposition.

The high price of molybdic acid induced us to employ in its stead the tungstate of soda now to be had in commerce at one-fifth the cost of the other, and the same object is attained in fact by employing a mixture of 30 equivalents of tungstate and one of phosphate of soda. But, taking into account that a complete precipitation by phosphotungstic acid is possible only in presence of a large excess of sulphuric acid, that the precipitate is much more difficult to wash than the phosphomolybdate of the alkaloid, and that in view of the difference in the equivalents, that in expense is after all only as 1 : 2: it is probable that the molybdic compound will be maintained in use, until tungstate of soda, as is quite likely, shall have become less expensive.

The precipitates formed by either of these reagents were, while still moist, mixed with carbonate of baryta, the pasty mass on the water bath with constant stirring reduced to dryness, and then exhausted with boiling alcohol. The alcoholic solutions on evaporation left a somewhat colored syrupy residue, without signs of crystallization, the solution of which in dilute hydrochloric acid, after filtering off some resinous matter, yielded on evaporation very fine crystals. When pressed between bibulous paper and repeatedly recrystallized from hot alcohol, these form

brilliant white rhombic prisms, half an inch in length, very readily soluble in water, also in ordinary alcohol, and scarcely in ether. From their watery solution they deposit in form of fernlike aggregations, have an acid reaction and taste, and are the hydrochlorate of the new base.

On drying this salt, with a pulp of carbonate of baryta and water, over the water-bath, and then extracting with boiling alcohol, the alkaloid will be left in a perfectly pure condition on evaporating the alcoholic solution, as a white mass of radiating crystals, of a sharp but not bitter taste, at once deliquescing in the air, readily soluble in alcohol, nearly insoluble in ether, fusing and decomposing when heated in a tube, and completely destroyed at higher temperatures.

Besides the hydrochlorate we have prepared in fine crystals the double salts with the chlorides of platinum and of gold, and the likewise crystallizable and very readily soluble, in part also deliquescent salts with sulphuric, nitric, chromic, acetic and oxalic acids.

We have as yet been prevented to enter more fully into an analytical investigation of lycina and its salts, and shall be unable to do so for some time to come. For these reasons we have thought it best to communicate the above first results, the more as we are of the opinion, that the mode of extracting the alkaloid which we have delineated will lead to the discovery of other similar ones which have hitherto been overlooked on account of their solubility.—(*Annalen der Chemie u. Pharmacie*, ii. *Supplement—Band*, *S.* 383, 1863.) F. F. M.

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## NOTE ON ATROPIA.†

By Dr. E Pfeiffer.

While engaged in the summer of 1861, together with my teacher, Prof. Ludwig, at Jena, in going over the reactions of some alkaloids which in many forensic cases serve almost as sole indications of their presence, we noticed the peculiar pungent benzoic acid odor given off by atropia during its combustion.*

* The same has been observed by Niemann in the combustion of the double chloride of atropia and gold. (*Dissertation über eine neue organische Base in den Coca-blættern*; Goettingen, 1860.)

† Translated for this Journal by Prof. Mayer, of New York.

Prof. Ludwig then recommended that I should distil a small quantity of the alkaloid with bichromate of potassa and sulphuric acid, in order to obtain in this manner, if possible, the volatile acid. In fact, after a little boiling, the sweetish odor often accompanying benzoic acid became perceptible, some drops of oil appeared on the surface, and on continuing the boiling, small iridescent scales and needles made their appearance in the receiving vessel, which, from their pungent odor and their shape as observed by the microscope, were easily recognised as crystals of benzoic acid.

This distillation was subsequently repeated twice with larger quantities (2 to 3 grammes) of atropia, using the proportions of 5 parts of bichromate of potassa and 15 of oil of vitriol, previously diluted with 3 times its weight of water, to every two of the alkaloid. Immediately after the boiling had commenced, there appeared in the receiver vapor of the odor of oil of bitter almonds. The first portions of the distillate gave to ether, on being shaken with it, a small quantity of a yellowish oil, which possessed this odor besides the property of becoming milky with water and yielding acicular crystals on evaporation with a drop of fuming nitric acid. When the boiling had continued for 10 minutes a considerable quantity of benzoic acid had collected on the surface of the now greenish fluid in the retort, in the form of a white froth, which was at once obtained pure by filtering and washing. Both filtrate and washings were then distilled nearly to dryness, from the distillate the benzoic acid extracted by agitation with ether, then combined with soda, and from the concentrated solution of the soda salt again separated by means of hydrochloric acid. In this manner about one-fourth of the quantity of atropia was recovered in the form of benzoic acid.

Its fusing point was exactly 248° F; the silver salt formed in acicular crystals with a mother-of-pearl lustre; both gave in ultimate analysis the numbers required for benzoic acid.

The residue from the distillation contains all the nitrogen of the atropia in form of ammonia; no other organic bases were to be found, for distillation with soda lye furnished a volatile product which, with chloride of platinum, gave pure double chloride of ammonium.

In the fall of 1862, I continued my researches at Gœttingen under the guidance of Prof. Geuther, and at his suggestion endeavored to perform the splitting of atropia by means of a concentrated solution of soda. The same alkaloid was used for these experiments, one part with 6 of caustic soda and 15 parts of water heated in a flask connected with a condenser, the far end of which was joined air-tight to a small flask, and this was again connected by means of a glass tube with another flask containing dilute hydrochloric acid.*

After boiling the alkaline mixture for about an hour, at first with occasional shaking of the flask, a period arrives when the oily drops of the alkaloid floating on the surface agglomerate and adhere to the sides of the vessel; and the vapours which before were visible in the receiver appear no longer. The operation is now interrupted, the whole of the original atropia being converted into a volatile base and an acid, the soda-salt of which latter is the pale resinous mass, which, though much denser than at first, is still floating on the surface of the excess of soda lye; further heating would cause it to assume a brown color, while products of a secondary decomposition would likewise result.

After the mixture has become cooled, water is added with care; this dissolves the excess of caustic soda; the resinous salt remains floating on the surface of the solution, and can be washed in this manner, at least from the portion of soda adhering on the outside. The cake is then dissolved in water and treated with carbonic acid, then evaporated to dryness, on the water bath towards the last, and freed from the carbonate of soda by means of alcohol. The alcoholic solution was evaporated in a little flask, and when cold the residue again dissolved, this time in ab-

* In a paper on "*Phosphomolybdic Acid as a test for Alkaloids*" (Proceedings Amer. Pharm. Association for 1862, p. 229–232.—Amer. Journ. Pharm., vol. xxxv. p. 63.—Chemical News) will be found an account of an experiment made for the purpose of ascertaining the presence of ammonia in Extract of Belladonna; the latter was mixed with caustic soda lye, and at the ordinary temperature a current of hydrogen gas passed through its solution; this gave off an alkaline vapor of an odor resembling that of conia, producing white fumes with acetic acid, and its solution in nitric acid gave a precipitate with phosphomolybdic acid. F. F. M.

solute alcohol; to this solution ether was added until precipitation was established, the cloudiness not disappearing on shaking, and the flask, well stoppered, was left to stand for 24 hours. Poured off from the remainder of the salts which had then separated, the ether-alcoholic solution left, on evaporation, a non-crystallizable, varnish-like mass, transparent but with a tinge of brownish yellow. The solution in water of this substance possesses an alkaline reaction. Though soluble in a small proportion of water, more of the latter causes a turbidity, which should be removed by filtration, and the clear filtrate then be considered a solution of the pure salt.

Hydrochloric acid separates from the watery solution the new acid, which appears at first in the form of drops of oil, but gradually solidifies and becomes crystalline; being but little soluble in cold water, the acid can be freed from chloride of sodium by means of water. On dissolving it in hot water and filtering, it left a brownish resin, difficultly soluble in water, and of an acid nature, to judge from its solubility in carbonate of soda, and its separation from this solution by other acids. This appears to be a product of the decomposition of the crystalline acid; it possesses an odor resembling mead, the same as the other previous to its purification. The latter crystallizes in brilliantly white rhombic plates similar to those of benzoic acid; its fusing point is at 208° 4 F., the point of congelation at 203° F. Its vapor has an acrid odor, similar to that of benzoic acid, but more sweetish; in the oxidation with bichromate of potassa and sulphuric acid, the pungent odor of benzoic acid was more prominent.

The crystals are free from nitrogen, and their formula, corresponding to 73·6 p. c. carbon and 6·1 p. c. hydrogen, is expressed by $C_{48}$ $H_{24}$ $O_{10}$. It is possible that, owing to the presence of some of the resinous acid, these numbers are somewhat too small, and that they are probably better represented by 74·1 p. c. and 6·2 p. c., which would give $C_{20}$ $H_{10}$ $O_4$ as the formula. In that case this acid would stand to cuminic acid in the same relation as acrylic acid to propionic. In its properties it shows in fact a certain resemblance to cuminic acid.

The volatile alkaloid which resulted from the action of soda on atropia remained on evaporating the hydrochloric liquid in the

receiver, as hydrochlorate in the form of deliquescent acicular crystals, handsomely arranged in concentric groups, aborescent at the margins. This is the only product to be found, besides traces of ammonia, which appear to be accidental, and a minute quantity of some resinous matter, easily removed by solution in water and filtering. Much less in proportion of this base was obtained than of the acid. Two grammes of atropia yielded 1·65 grains of the soda salt, but only ·3 of a gramme of the hydrochlorate of the alkaloid.

From the latter the alkaloid was obtained in the free state by means of caustic soda, as an oily liquid of a faint ammoniacal and peculiarly sweet odor. The solution of the hydrochlorate mixed with chloride of platinum yielded a soft resinous compound not fitted for analysis, while chloride of gold appeared to form a double salt soluble in water. Three combustions were made with small quantities of the hydrochlorate, 0·1 gramme for each, and the resulting numbers, though they have as yet no positive claims of correctness, will serve to give an idea of the proportions in which the constituents are combined. The numbers found were 54·4 p. c. of carbon, 10 p. c. of hydrogen, 20·7 p. c. of chlorine, 10·1 p. c. of nitrogen; the loss of 4·8 p. c. must be attributed to hygroscopic water, and consequently this base is free from oxygen. Further investigations will have to be made in order to establish its true formula.

The result of the action of soda on atropia is therefore a decomposition of the alkaloid into an acid and a base, from which follows that it will have to be ranged among the amides.—*Annalen der Chemie u. Pharm. Band* cxxviii. p. 273.—F. F. M.

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## ON ATROPIA.*

By Dr. K. Kraut, of Gœttingen.

It has been known, ever since the discovery of this alkaloid, or rather even before it had been isolated, that the narcotic principle of belladonna underwent decomposition by treatment with alkalies as well as concentrated acids. Nothing very definite has ever been published in regard to these decompositions, beyond the discovery of an acid resembling benzoic in belladonna, by W. Richter,

* Translated for this Journal by Prof. F. F. Mayer, of New York.

the remarks of the discoverers of cocaïna on its relation to atropia, and the note of Ludwig and Pfeiffer on the decomposition by means of chromic acid; all of which pointed very strongly to the probability of one of the products of the decomposition belonging to the group of aromatic compounds.

The experiments which I now communicate are not yet concluded, but are given in their present shape, since I have ascertained that the same subject was under examination by others.

When atropia, in a sealed tube with a hot saturated solution of baryta in water, is kept in the water-bath for two or three hours, a clear colorless solution is formed, which, when afterwards diluted with water and submitted to distillation, yields but traces of a volatile base, and from the residue carbonic acid precipitates carbonate of baryta free from organic matter. The filtrate from this precipitate, which is neutral and contains slight traces of baryta, on evaporation leaves a colorless amorphous varnish in which, after standing for some weeks over oil of vitriol, there appear a few stellate crystals, less soluble in water than the remainder, and containing all the baryta still present. The soluble part of the extract, forming the principle portion, is an uncrystallizable salt formed by the splitting of atropia after receiving two equivalents of water. Dissolved in water it is at once rendered milky on the addition of hydrochloric acid; after a few seconds acicular crystals of an acid are deposited while a base remains in solution combined with hydrochloric acid.

To obtain the acid the mixture is filtered, and the filtrate repeatedly shaken with ether, which dissolves the acid. I shall name it *atropic acid*, and the base *tropia*. The reaction by which they form is represented by the following formula:

$$(C_{34}\,N\,H_{23}\,O_6) + 2\,HO = C_{18}\,H_8\,O_4 + C_{16}\,H_{17}\,NO_4$$

Atropia. Atropic acid. Tropia.

The crystals obtained from a solution in alcohol are oblique prismatic plates; formed from watery solutions they are acicular and possess the odor of benzoic acid, and melt and form an oil at 222° F. The saturated solution in hot water congeals to a crystalline mass on cooling. The acid contains 72·97 per cent. C and 5·41 per cent. H, therefore its formula is $C_{18}\,H_8\,O_4$, and

it is isomeric with cinnamic acid. The lime-salt, which is readily obtained in fine crystals, appears to be $C_{18}$ $H_7$ Ca $O_4$+3 Aq.

*Tropia.* I have as yet been unable to prepare this alkaloid in a perfectly pure form. On evaporating the original solution of its hydrochlorate, the salt crystallizes out in needles, which are again readily dissolved by water. Oxide of silver added to the solution renders it strongly alkaline, though no silver remains in solution. On evaporating the filtrate a crystalline residue is left behind, which appears to have absorbed carbonic acid from the air, and to have been also otherwise changed; at least the platinum-salt could not again be obtained from it.

From the solution of the hydrochlorate of tropia chloride of platinum precipitates this double-salt in fine orange-colored crystals, which give a yellowish red powder. Its composition is $C_{16}$ $NH_{17}$ $O_4$, HCl, $PtCl_2$. With chloride of gold there is likewise obtained a double salt in well-developed crystals. The alkaloid appears to undergo some decomposition when kept heated at 356—380° F. with baryta water for 17 hours, still the decomposition is not complete, nor is its product volatile. But by continued boiling of the aqueous solution of the alkaloid small portions of it are volatilized; for this reason the distillate obtained from tropia with baryta water possesses a slightly alkaline reaction, and in the residue are found traces of atropiate of baryta.

*Atropiate of tropia* is uncrystallizable, at ordinary temperature of a viscid consistency, and fuses readily with heat. A solution containing 2¼ per cent. produced no enlargment of the pupil. Its composition is represented by $C_{16}$ $NH_{17}$ $O_4$, $C_{18}$ $H_8$ $O_4$ + 3 Aq. Two equivalents of the water only are driven off at 184° F.

Atropia is decomposed likewise by hydrochloric acid. Heated with fuming acid for four hours in the water-bath, the solution still retained some atropia, but after continuing the action for two hours more at 221° F. it yielded, with chloride of platinum, crystals resembling those of the tropia-salt. Here there was likewise formed an acid which had separated in the form of oily globules; these, however, I have as yet been unable to identify with atropic acid.

In connection with the above I have instituted a series of ex-

periments for the purpose of investigating the action of *caustic baryta* in the presence of water on such substances as are not affected by it at 212° F., but which, on being heated with other caustic alkalies, yield various products of decomposition. Preliminary experiments have shown me that *glycina* begins to be decomposed when kept at a temperature of 311° F. with concentrated baryta-water for 22 hours, methylamina being one of the products; *nicotina* at 338° F. yields a base, the platinum-salt of which differs from the double chloride of nicotina and platinum; *morphia* and *cinchonia*, at 480°—505° F., form small quantities of volatile bases. One of the secondary products of the reduction of nitrobenzole by Béchamp's method, is at 374° F., split entirely into a volatile base and an acid, of which latter I have now the baryta-salt under examination.—*Annalen der Chemie u. Pharm.*, cxxviii. p. 280—285.

NOTE.—Richter describes as *atropic acid* a substance closely resembling benzoic acid, but yielding no precipitate with ferric salts. In his method for preparing atropia, by setting the watery infusion of the root to ferment with yeast, and treating the clarified extract with ammonia and ether, this acid remains in combination with the ammonia, is afterwards combined with potassa, and then separated by means of sulphuric acid. It is more than probable that the acids obtained by Richter and Pfeiffer, as well as by Kraut, are identical.

The proneness of atropia to undergo a change or decomposition when exposed to moisture or at a higher temperature, or in contact with alkalies, has been noticed by Geiger and by Berzelius, and the experiments detailed on pp. 26—28 of Vol. xxxv. of this Journal may serve as illustrations of the decomposition which the alkaloid undergoes under such circumstances while still in its natural combination. Berzelius gave the name *tropia* (tropin) to the amorphous substance which results when atropia is left for some time in its mother-liquor. This varnish-like matter, a portion of which only forms into crystals after standing for some time, retains the properties of an alkaloid only in part, and requires much less than the calculated quantity of iodohydrargyrate for precipitation. It possesses a peculiar narcotic odor, and its

diluted solution deposits a reddish-brown, humus-like substance, devoid of narcotic properties.

Besides atropia, there is present in belladonna a volatile base, which has been mentioned by Brandes, and has been separated by Luebekind as a crystalline sublimate on distilling the leaves with caustic potassa. The extract of belladonna likewise yields a volatile base at ordinary temperatures in contact with caustic alkaloids. It remains then to be seen in what relation these four alkaloids stand to each other and to atropia. F. F. M.

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## ON THE CONTAMINATION OF AMERICAN SULPHURIC ACID WITH ARSENIC.

By John M. Maisch.

The query allotted to me for investigation, is: "Do any of the best samples of sulphuric and other mineral acids of American origin, contain appreciable amounts of arsenic?"

The mode of investigating the subject was as follows:

The sulphuric acid was treated directly in Marsh's apparatus, with pure zinc, and the hydrogen evolved treated in the well known manner. The nitric acid was partly saturated with pure carbonate of soda, evaporated to dryness, the residue treated with an excess of pure sulphuric acid, heated to drive off the nitric acid, re-dissolved in water, and now examined in Marsh's apparatus. The muriatic acid was diluted with water, sulphuretted hydrogen was passed through it, and the dried precipitate, after being mixed with dry carbonate of soda and cyanide of potassium, was heated in a current of dry carbonic acid gas, according to the method of Fresenius and Baba.

I have examined the three mineral acids named, manufactured by Kalbfleisch, of New York, Powers & Weightman, Rosengarten & Sons and Charles Lennig, of Philadelphia, and have in no case met with *any* trace of arsenic.

This result appears to speak well for American acids. But it must be remembered that the query is therewith not fully answered. The origin of arsenic in the mineral acids is to be looked for in the sulphur, which frequently contains traces or larger proportions of arsenic in the form of sulphides. The arsenic is volatilized when the sulphur is burned in the manufacture of sulphuric acid, and if this acid is contaminated with this

poisonous metal, the nitric acid *may*, and the muriatic acid *must*, contain the same. But its absence in two or three samples does not prove yet that it may not be found in the fourth one. The only way to get at positive results is, to subject every sample to a rigid examination, which is at once a very interesting and a very easy process of manipulation.

The decision, however, at which we arrive from these experiments is, that acids of American manufacture are of the same purity, as far as arsenic is concerned, as those of foreign origin. While I have, on former occasions, occasionally met with arsenic in American oil of vitriol, yet this metal does not constitute one of the impurities of every sample, and the acids produced by the same manufacturer are likely to vary considerably in this respect.—*Proceed. Amer. Pharm. Assoc.*, 1863.

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## ON THE EXTRACTION OF POTASSA FROM MARL.

By George J. Scattergood.

The green sand or marl of New Jersey, according to analysis, contains, among other constituents, from 10 to 12 per cent. of potassa. Query. "Can this potassa be economically extracted sufficiently pure for pharmaceutical and commercial use, so as to compete in price with that derived from wood ashes?"

The experiments which have been performed in reference to this question require that it should be answered decidedly in the negative. The small proportion of potassa, and the very insoluble form in which it exists in the green sand, are insuperable obstacles to the latter ever becoming a cheap source of commercial potash. The results, however, which have been obtained are not entirely devoid of interest, since they show the effects of certain agents upon a substance whose chemical nature is as yet but little known.

The earlier analyses of green sand have shown, as above stated, the large amount of 10 or 12 per cent. of potassa. But later investigations, performed by improved methods, have not confirmed their accuracy; but, on the contrary, have pointed to the fact, that the alkali, previously estimated as potassa only, is in part soda, and that the average amount of the former throughout the green sand formation in New Jersey does not probably average more than 5 per cent.; and from but few specimens can

as much as 7 per cent. be obtained. (Report N. J. State Geological Survey, 1854.)

The green sand with which the following experiments were tried contained about 6 per cent. of potassa. It is from the second or middle of the three beds into which this deposit in New Jersey has been divided, and was dug on the land of David Marshall, near Blackwoodtown, Camden County. An analysis, performed by the general process for the analysis of soils, has given the following results, viz.:

| | (1) | (2) |
|---|---|---|
| Insoluble Silica, | .5 | 48. |
| Soluble Silica, | 48. | |
| Protoxide Iron, | 22.74 | |
| Alumina, | 6.61 | |
| Potassa, | 5.01 | 6.84 |
| Soda, | 1.08 | 1.47 |
| Lime, | 1.975 | |
| Magnesia, | 1.375 | 1. |
| Phosphoric Acid, | 4.821 | |
| Water, | 7.50 | |
| | 99.611 | |

The phosphoric acid was estimated as the biphosphate of magnesia. This specimen is in the usual form of small, distinct, green grains, soft enough when freshly dug to be readily crushed by the nail, but becoming harder on exposure to the air; and exhibiting under the microscope, when washed from adhering clay, a general resemblance in shape to the "casts" of the Rhizopods, and other minute marine animals. In order to separate the potassa from the green sand, I have tried several of the cheap and powerful chemical agents,—carbonic, hydrochloric and sulphuric acids, quicklime and sulphate of lime.

Carbonic acid, though a weak acid, has been stated to be one of the readiest agents in decomposing green sand. But I have not been able to obtain by it any appreciable amount of potassa, and only a trace of iron and lime. The quantities used were 100 grains of green sand, and 12 oz. of water charged with carbonic acid.

Hydrochloric acid decomposes green sand, only after being boiled with it for several hours, or after contact with it for seve-

ral days in the cold. The potassa is thus obtained as a chloride—an undesirable form—and in mixture with other chlorides, the separation from which is attended with considerable expense.

When green sand is treated with sulphuric acid, the alumina as well as the potassa is dissolved, resulting in the formation of alum. As the quantity thus obtained is considerable, and as this substance has several times already been suggested as a commercial source of alum, I have tried a number of experiments to ascertain the comparative yield. 3500 grains of green sand were treated with 1750 gr. sulphuric acid (62 per cent.) diluted with water. The first crop of crystals weighed 630 gr.; the second 200 gr.; in all 830. The mother liquors, still being quite acid, were mixed with 1750 grains more of green sand, and yielded at a third crop 306 gr. of alum. Again, adding a fresh portion of green sand (1750 gr.) 100 grains more were obtained, making in all 1236 gr. of alum from 1750 gr. sulphuric acid, and 7000 gr. green sand employed. A large quantity of the soft sulphate of the sesquioxide of iron was also obtained, capable of yielding a considerable amount of copperas on being reduced with metallic iron.

When the green sand had been previously roasted, the yield of alum was still greater. The protoxide of iron in the green sand being thus converted into the more insoluble sesquioxide, and thus rendered less capable of combining with the sulphuric acid. 1750 gr. sulphuric acid (62 per cent.) treated with successive portions of roasted marl, yielded 1686 gr. alum, and an amount of the sulphate of the sesquioxide of iron sufficient to produce 693 grains copperas.

When the green sand was washed from the adhering clay, which in this case constituted about 9 per cent. of it, the yield of alum was not so great. A greenish crystallo-granular mass, apparently the bihydrated sulphate of the protoxide of iron, not observed in the preceding cases, was also obtained. 1750 gr. sulphuric acid (62 per cent.) treated with successive portions of washed green sand, produced 785 gr. alum and 626 gr. copperas.

It thus appears that, with a cheap source of sulphuric acid, the manufacture of alum from the green sand of New Jersey might, perhaps, be profitably carried on. And it may possibly hereafter be found that, within the limits of this formation it-

self in New Jersey, the material for furnishing a cheap supply of the acid exists; in the sulphuret of iron, which is widely disseminated throughout certain sections of it, or in those compounds of iron or of alumina and iron with sulphuric acid, which give those properties so injurious to vegetation to the so-called "poison," or "burning marls."

The state of combination in which the ingredients of green sand exist in it, has been considered to be that of silicates. Pelouze has called attention to the power which sulphates of lime has in decomposing glass, a mixture of various silicates. With a view to ascertain whether sulphate of lime would have any effect in removing potassa from the green sand, 50 grains of it, 100 of green sand, and 4 oz. water were mixed together, and allowed to remain in contact two or three days. Upon evaporating the liquid to dryness, 6.31 grains of solid matter were obtained, which contained only .06 gr. of potassa, about $\frac{1}{100}$ th of the amount existing in the quantity used, the remainder being principally sulphate of lime.

When green sand is treated with quicklime and water, a very small amount of potassa is obtained. 100 grains quicklime, 100 grains green sand, and 4 oz. water were mixed together, and after standing in contact for seventy-two hours, the liquid was evaporated to dryness. The solid matter obtained weighing $5\frac{3}{4}$ grains contained but .04 gr. of potassa; alumina, protoxide of iron, and carbonate of lime constituting the remainder.

The form of combination in which the silica, the iron, and the other ingredients exist in the green sand has not been fully determined. This substance has been regarded as essentially a protosilicate of iron. But I have noticed that, upon treating the grains with acid, without powdering them, after the green portion of them is entirely dissolved, the silica is left behind in the form of small, white grains, of the same shape as the original grains, and not in that state of fine division in which it would be if it had just been liberated from a state of combination. These grains of silica, after ignition, are readily soluble in a cold solution of potassa, from which facts it is inferred that the silica has not been combined with iron, &c., as a silicate; and that the green sand should not be considered as a mixture of various silicates. Whether these ingredients are in a state

of combination at all, or merely in intimate mixture, remains unascertained.

It would appear that during that remarkable change which has resulted in the formation of these "casts" of minute marine animals, which the researches of Ehrenberg and the late Prof. Bailey have shown these green grains to be, the silica has been deposited in the cavity of the shell upon or during the decay of the animal; while the green colored matter, consisting of iron, alumina, potassa, &c., has been gradually deposited in the shell around it by a kind of petrifactive process during the removal of its carbonate of lime.—*Proceed. Amer. Pharm. Assoc.*, 1868.

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## ON THE PREPARATION OF IODIDE OF AMMONIUM.*

By Dr. Jacobsen.

The author dissolves equivalent weights of pure iodide of potassium and pure sulphate of ammonia in the smallest possible quantity of boiling distilled water. One part of sulphate of ammonia will require about one and one-third of its weight, and iodide of potassium about half its weight of boiling water for solution. The two solutions are then mixed and well stirred. After the mixture has cooled, water containing 15 per cent. of alcohol is added, and the whole is allowed to stand twelve hours. In very cold weather less alcohol will suffice to separate the sulphate of potash formed. According to Schiff,† 100 parts of water and 10 parts of alcohol at 15° C. only dissolve 8·9 parts of sulphate of potash.

The iodide of ammonium, in consequence of its greater solubility, remains in the solution, which is now drained from the precipitated sulphate of potash, filtered, and evaporated until a pellicle forms. As the solution is very concentrated, the evaporation is quickly effected.

After the crystals of iodide of ammonium are formed, they are drained from the mother liquor, which, together with the residue of sulphate of potash, is again treated with dilute alcohol, and the liquor evaporated for a further yield of sufficiently pure iodide. Care must be taken to exclude all acid vapors from the chamber in which the evaporation is carried on; and it is well to add to the solution, from time to time, a few drops of ammoniated alcohol.—*Lond. Chem. News, April* 9, 1864.

* News Jahrbuch. für Pharmacie, bd. cxx. vii., s. 256.
† Ann. der Chem. und Pharm., bd. cxviii., s. 365.

## OXYGENNESIS, FOR THE INSTANTANEOUS PRODUCTION OF PURE OXYGEN WITHOUT HEAT.

By Mr. J. Robbins.

From the time of the discovery of oxygen to the present, perhaps no subject has so much engaged the attention of chemists as the production of it at a cost sufficiently low to be employed in the arts, for the reduction of metals and other operations requiring a high temperature, and also for the purposes of illumination, the light obtained by it vieing in splendor with with the sun's rays. This desirable object has yet to be accomplished, and may be regarded as a prize to be won by some future happy discoverer. It seems surprising, since Nature has provided us so bountifully with this substance, and presented it in such a variety of combinations, that, up to the present time, there should be no known method of separating, except at such a cost which excludes it for the purposes just enumerated.

In Gmelin's "Chemistry" six processes are given for the production of oxygen :—

1st. By heating chlorate of potash to low redness. As this process is slow and tedious, a small quantity of oxide manganese is usually mixed with the salt, which greatly facilitates the decomposition, and the evolution of gas is both rapid and abundant. According to the authority just named, manganese is often mixed with carbonaceous matter, which passes over as carbonic acid, but another impurity I may mention is the presence of chlorine, which, I believe, may always be detected when oxygen is obtained by this method.

2d. By ignition of red oxide of mercury. The presence of hyponitric acid may be feared in oxygen so obtained.

3d. By strong ignition of oxide of manganese.

4th. By heating manganese with an equal weight of oil of vitriol.

5th By ignition of nitrate of potash. This salt, when heated above its melting point, is converted by the loss of two equivalents of oxygen into nitrite of potash ; on a further increase of temperature both nitrogen and oxygen pass off, consequently the product is always contaminated with nitrogen, which increases as the action proceeds.

6th. By the action of sulphuric acid on bichromate of potash. Three parts bichromate potash and four parts sulphuric acid are heated together in a capacious retort. An evolution of oxygen gas easy to regulate is the result. In this experiment we might congratulate ourselves if the process is conducted to the end without a fracture of the retort.

Of the six processes just described, two only are now used—viz., chlorate of potash with or without manganese, and manganese alone. More recently other processes have been recommended, one of which, by heating together nitrate of soda and oxide of zinc, has been patented. From this mixture oxygen is said to be produced at a cheaper rate than by any other method at present known. Unfortunately for the value of this discovery the product is contaminated with a considerable per-centage of nitrogen. M. Kuhlman, of Lille, discovered and published an ingenious and beautiful process for the production of oxygen by means of baryta. He found that by passing a current of common air through caustic baryta heated to dull redness, peroxide of barium was formed, which, on an increase of temperature, is resolved into oxygen gas and caustic baryta; the latter ready again to perform its part in a similar operation. The idea naturally suggested itself that the means were now at hand for getting oxygen from the atmosphere in any quantity at a small cost. This method, although so promising, has been for the present abandoned; it was found that after a few operations, either from a molecular change, or from the silica or other impurities, a sort of glass or fusion resulted on the surface, the baryta then refusing to act again.

We now come to the consideration of the new method for the generation of oxygen recently introduced by myself. The process or the compound employed in it has been named *oxygennesis*. It will have doubtless been observed by you that in all the processes hitherto known, a high temperature is necessary, and until that point is reached, no product whatever is obtained; this fact we may consider as the chief difficulty experienced in the preparation of oxygen, and more especially so when sulphuric acid is used. If, for example, by the mere addition of sulphuric acid to bichromate of potash in the cold, we could get the same results which are obtained by the application of heat,

this process, instead of being thrust in the rear, would have taken front rank.

Oxygennesis, therefore, stands alone as a novel and the only mode we possess for producing oxygen without the application of heat. The mode of using this compound is extremely simple. We have only to take some of this powder, place it in a glass flask or bottle provided with an exit tube, pour on any of the dilute mineral acids, and we have immediately oxygen evolved in a similar way, and with as much facility, as hydrogen is obtained from zinc or carbonic acid from a carbonate.

The composition of this compound is extremely simple, merely peroxide of barium, and bichromate potash. Not so the chemical changes resulting from an addition of an acid. Peroxide of barium, on addition of sulphuric acid, is resolved into sulphate of baryta and peroxide of hydrogen, and it is from this sometimes so-called oxygenated water we get this curious and interesting chemical reaction. Whenever peroxide of hydrogen and chromic acid are brought into contact with each other, instantaneous decomposition is the result, the chromic acid is reduced to sequioxide of chromium, and the peroxide of hydrogen to water; at the same time pure oxygen derived from both those substances is disengaged. The theory of this very interesting reaction is not, I believe, well understood, and I know only one way of explaining it, that is, on the ozone and antozone theory of Brodie. According to that theory, oxygen exists in three different states or conditions, viz., ozone, antozone, and ordinary oxygen, and whenever ozone and antozone (which may both be considered more or less active) are brought together, they unite and neutralize each other, as it were forming passive or common oxygen.

To return to the composition of the powder, we are not compelled to use precisely those ingredients mentioned, but may substitute analogous compounds. Peroxide of barium might be replaced by any other peroxide capable of forming binoxide of hydrogen, of which there are several—peroxides potassium, sodium, strontium, and calcium—but all these at the present time are practically useless, peroxide of barium being the only one that can be easily and cheaply prepared. Bichromate of potash may be substituted by manganate or permanganate of potash,

binoxide of manganese or binoxide of lead; the cost of the two first-mentioned forbids their present use, and the one selected is by far preferable to the others. With regard to the acids, either of the mineral class will do, but I prefer a mixture of dilute sulphuric and hydrochloric acids.

The next question demanding our notice is, in a commercial point of view, a most important one; however much this method may be admired for its simplicity, and the ease with which the operation may be conducted, its ultimate success or failure must depend on its cost. Can the oxygennesis, therefore, be manufactured and sold at a price sufficiently low to make it an article of commerce? I believe it can be, and be made available for all purposes wherever oxygen is required to the extent of some gallons. One of the ingredients of this compound, peroxide of barium, has never yet been produced and sold as a commercial article, and from the trouble of making a small quantity, but few even practical chemists care to prepare it for themselves. It can hardly, therefore, be expected that a compound of this nature can at once be manufactured and sold at a price it must ultimately be reduced to, if extensively used and produced in quantity. 5s. per pound, the price hitherto charged, would, I admit, be a barrier to its general adoption; but I am happy to say we have now made the necessary arrangements to lessen the cost of production, and have at the same time reduced the price.

Some of the baryta compounds are found abundantly in nature, and are of but small value in the market, but up to the present time but few uses have been made of them; they now promise a much more extensive application. Mr. Kuhlman has, perhaps, done more than any one else to develop their uses and value in the arts, and in the *Chemical News*, November 28, 1863, will be found some interesting extracts relating to them from Dr. Hofmann's report on chemical products and processes of the International Exhibition.

I shall trespass a little further on your time to make a few remarks on one of the various applications of oxygen, which may be of some interest to the medical profession and to pharmaceutical chemists. I mean the employment of that body as a therapeutic agent by inhalation. For that purpose this ready

method for producing the gas promises to be of great value. Towards the end of the last and the beginning of the present century, vital air, as oxygen was often and not inappropriately called, was used largely in this country and on the Continent. In this country we find the names of Drs. Beddoes, Hill, Thornton, and other physicians. Dr. Hill used it for more than twenty-five years, and Dr. Thornton was quite eminent for his successful application of it. At the present time the desire by medical men for the administration of oxygen has revived both here and abroad. Two papers have recently been read, to be followed by others on the same subject, before the Academy of Sciences at Paris, by Messrs. Demarquay and Leconte. The experiments and observations of those gentlemen appear to have been very numerous and carefully made both on animals and on man, in disease and in health, and the conclusion they arrive at is, that oxygen is a valuable curative agent. If so good, then, as a remedy when its value was once known, what caused it to become and continue so long neglected? The explanation is, I think, not difficult. In the first place, when this body was discovered, too much was expected from it. The first *furore* for its employment arose from the simple experiment which showed its power of rekindling an expiring match, and as oxygen is the essential element of our existence, it was supposed it might, in a similar way, rekindle the expiring vital spark. The more imaginative were elated at what they considered a discovery, so long dreamt of and so earnestly sought after by the alchemist. But oxygen is not the elixir vitæ. It will not restore grey hair to its original color, nor make an old man young. The difficulties and expense attending its administration may also be considered other reasons for its non-employment. Of what use was it for a medical man to order that which the patient could not get supplied? A physician, therefore, having faith in the remedy, was compelled to lay himself out especially for it, become an oxygen doctor, and prepare and administer the remedy himself. These difficulties now no longer exist.

We have on the table an oxygen inhaler and generator, made according to the suggestions of Dr. Richardson. The generation of the gas is by this method so easy and and so simple that patients can prepare their own dose, or, if need be, the nurse

after one lesson can as well undertake the operation as any other duty she may be required to perform.

Physicians who may wish to employ this remedy may now prescribe it with no more hesitation than they would prescribe a black draught or a calomel pill.

Dr. Squire wished to inquire whether Mr. Robbins' invention had not been patented; if so, he doubted the value of the patent, for Professor Brodie had pointed out in 1851, that when peroxide of barium was treated with an acid solution of bichromate of potash oxygen was evolved with great regularity. Faraday had mentioned the same thing in one of his lectures on ozone at at the Royal Institution. Dr. Squire also objected to the name oxgennesis, and thought it ought rather to be called oxyexodus, as the oxygen was eliminated, not created.

Mr. C. H. Wood said that the reactions of peroxide of barium, and bichromate or permanganate of potash were well known as scientific facts, but did not consider that that affected the value of Mr. Robbins' patent. The great objection to Mr. Robbins' process was the cost of the oxygen, and he was glad to hear that this was likely to be reduced. He did not consider that the process was easier than that for obtaining oxygen from chlorate of potash and manganese; indeed, he thought the latter the easier operation. He wished to know how Mr. Robbins decided that oxygen from chlorate of potash and manganese was contaminated with chlorine, and not by ozone. The late Mr. Witt had shown that oxygen obtained in this way always contained a variable proportion of ozone. He (Mr. Wood) did not consider ozone objectionable for inhalation, for he thought that whatever good was effected by oxygen when inhaled, must be due to the ozone which gave active properties to oxygen.

Professor Redwood said that Mr. Crace Calvert had pointed out that oxygen from chlorate of potash and peroxide of manganese always contained chlorine or an oxide of it, and he did not think that the gas from this source was fit to administer. He freely gave his testimony to the value of the process Mr. Robbins had introduced. The process was certainly easy, though it was not calculated for chemists, but would answer well when oxygen was wanted for medical purposes.

Mr. Robbins, in reply, said that he was not aware of Mr.

Brodie's experiments, and had not heard of them, although he had spoken to many chemists on the subject. He considered it a great boon to be able to get oxygen by a cold process, and, at all events, still considered the application new. Authorities differed as to the value of oxygen as a curative agent, but the most recent experiments of Demarquay and Leconte seemed to prove that it possessed great remedial power. Under these circumstances it was well to have a means of procuring oxygen as easily as making a cup of tea. With regard to Mr. Wood's doubt about the presence of ozone instead of chlorine, he might say that, in conjunction with Mr. Brown, now of the War Department, he had examined many specimens of oxygen obtained from the chlorate and manganese for ozone, but in all cases found chlorine instead. In his (Mr. Robbins') process the oxygen was well washed.

Mr. Wood said that washing would not remove ozone.

Mr. Robbins replied that Faraday had showed that ozone could be removed by washing, and he himself had found ozone made by means of phosphorus in the ordinary way disappear after shaking with water well for an hour.

The Chairman said he considered Mr. Robbins' an elegant way of procuring oxygen for medical purposes, which had the recommendation of cheapness when the oxygen was considered as medicine.—*Chem. News, London, March* 12, 1864, from *Trans. Lond. Pharm. Society.*

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## NOTE ON THE RECOVERY OF ESSENTIAL OILS FROM THEIR WATERY SOLUTION.

By Mr. T. B. Groves.

I had occasion a short time since to attempt the concentration of an aromatic water into a spirituous essence. It occurred to me to try the process stated in the "Reports of the Juries, 1851, article 'Soaps and Perfumery,'" to be practised by M. Piver. Accordingly I agitated the water in successive portions, with about one-eighth its volume of olive oil. This process, although laboriously followed, with proper care taken in recovering the oil after each shaking, failed to transfer any large proportion of the aromatic oil from watery to oily solution.

A slight modification of the process which it is the object of this note to point out, made it succeed admirably, and at the same time saved the whole of the manual labor.

The olive oil added was *emulsed* in the aromatic water by solution of potash: after standing for some time, the emulsion was destroyed by the addition of an acid, when the olive oil immediately rose to the surface, dragging with it almost the whole of the aroma. From the fatty oil the aromatic oil was easily separated, by agitation with rectified spirit.

I have not ascertained by experiment either the best fatty body to use in this process, or the best mode of effecting or destroying the emulsion; I leave these points open for those who use the method practically; but it appearing to me to be capable of being put to some use, at least in scientific inquiry, I have ventured on the above short recital of the facts.—*Pharm. Jour., Lond.*, Feb., 1864.

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## ON THE VERIFICATION OF CASTOR OIL AND BALSAM OF COPAIBA BY MEANS OF THEIR COHESION FIGURES.

By Charles Tomlinson.

Lecturer on Physical Science, King's College School, London.

Every one in this place must be aware of the mode of preparation, and the properties of castor oil. The seeds of *Ricinus communis* are boiled and pressed, or simply pressed without boiling, forming, in the latter case, what is called *cold-drawn* castor oil. During many years the supply of the oil to this country was almost entirely from the East Indies* (from Bombay and Calcutta). The price was low and the oil good, both as to color and taste. I have on the table a very fine specimen from the India Museum, furnished to me through the kindness of Dr. Forbes Watson. Small quantities of castor oil have been sent to this country from New York, the West Indies, and Australia, and some houses in this country have imported the seeds from the East Indies, and have drawn their own oil by pressure.

* The castor-oil plant is cultivated all over India for domestic use, chiefly for burning. The oil is extracted by bruising the seed, boiling in water, and skimming.

We still procure large quantities of the oil from the East Indies, but that country has now a rival, threatening to become formidable, much nearer home. In the International Exhibition Italy had a great show of castor oils. One firm at Legano is said to produce 45 tons of oil every year, the produce of about 120 tons of seed. At this establishment, presided over by M. Valeri, the machinery for cleaning and sorting the seeds, the hydraulic presses, and the filtering apparatus, are said to be well arranged. The oil cake is in great demand as a manure for hemp. The oil is also used for burning, and in some places for making soap, this oil saponifying more easily than olive oil.

The cultivation of castor oil is said to be increasing in France; the yield is very great, a single plant from one seed producing upwards of 800 or 900 seeds. The seeds sometimes yield more than half their weight of oil. The French and Italian oils are weaker than those from the tropics. Italian oil, prepared in Italy, of which there are some samples on the table, is a good bland oil. There are also other specimens, prepared in this country from decorticated Italian seeds.

The oil, as you know, is very viscid, the color is yellowish, the taste, or rather *after-taste*, somewhat acrid, varying however with the freshness of the oil, and the mode of preparation. It retains its fluid, viscid character probably as low as 0°F. It differs from other fixed oils in being soluble in alcohol, a property which was long regarded as a test, until Pereira pointed out the fact that castor oil enables other fixed oils to dissolve in alcohol to the extent of 30 per cent. and upwards, so that a specimen may be mixed with olive, lard, nut, and other oils, and yet be soluble in alcohol. For example, *one* volume of olive oil, *two* volumes of castor oil, and *two* of rectified spirit, shaken together and gently heated, will form a transparent homogeneous solution. Benzoic acid and camphor also increase the solubility of castor oil in spirits containing 75 per cent. of alcohol (sp. gr. 0·860). What is called *concentrated castor oil* is common castor oil mixed with a small proportion of croton oil, which also enables other fixed oils to dissolve in alcohol to the extent of from 30 to 50 per cent.

It is superfluous to remark in this place that the distinction between chemistry and physics is not recognized by nature.

Hence a lecturer on physics may address chemists without being accused of temerity, and there are numerous precedents for substituting a physical test for a chemical one, where the latter is defective, or not sufficiently expeditious for ordinary purposes. Such is the test that I venture to propose to-night, and I apply it to castor oil and balsam of copaiba, not because it is peculiarly adapted to those substances, but because they are so well known and so largely used in medical practice. My test is of a far more general kind. It is applicable to every independent liquid, by which I mean, not a solution, although it is possible that hereafter solutions may be examined by its means. The test, as I now submit it to your critical judgment, depends on the forces of cohesion, adhesion, and diffusion. For example, if I gently deposit a drop of an oil hanging from the end of a glass rod, upon the surface of chemically clean water, contained in a chemically clean glass, a contest takes place between the forces in question the moment the drop flattens down by its gravity upon the surface of the water. The adhesion of the liquid surface tends to spread out the drop into a film, the cohesive force of the particles of the drop strives to prevent that extension, and the resultant of these two forces is a figure which I believe to be definite for every independent liquid.* The figure thus produced I name the *cohesion figure* of the liquid in question. Doubtless if there be two or more liquids in nature of different chemical composition, but precisely alike in their physical characters, such as their density and molecular attraction, and relations to heat, whereby at a given temperature they are equally fluid, or limpid, or viscid, then doubtless the cohesion figures of those two liquids would be identical. I have succeeded in converting the cohesion figure of one

* Strictly, the figure is a function of adhesion, and diffusion: or—

$$F = f(CA\delta)$$

in which F is the figure, C the cohesive, A the adhesive, and $\delta$ the diffusive forces. The formula may also be represented in other ways. For if S be the solubility, $d$ the density, and $a$ the molecular attraction, then—

$$F = f(S\delta)$$
$$\text{or } F = f(Sda)$$
$$\text{or } F = f(CAda)$$

all these being identical.

essential oil into that of another by dissolving camphor in one of them, but in such case other characters were introduced which disturbed the comparison.

As the cohesion figure of a liquid depends so much on the adhesion of the surface, it is quite necessary that that surface be chemically clean. The water need not be distilled. I have found the New River Company's water well adapted to the purpose, but the vessel must be specially prepared. All vessels exposed to the air contract an organic film from their condensing on their surfaces the breath of animals, etc., and also other impurities from the products of combustion, dust, etc. If we attempt to clean the glass with a duster, however well we may satisfy the eye, we do not remove this organic film, or if we remove one, we substitute another from the cloth held in the hands ; so that when the glass is filled with water, the film in question is detached, and spread over the liquid surface, effectually preventing adhesion. The plan I recommend is to appropriate certain glasses, about four inches in diameter at the mouth, to the purpose ; to wash them out occasionally with commercial sulphuric acid, to rinse with water, and after every experiment to wash out the glass with a solution of caustic potash, and to rinse with water before filling up again. The water used for the experiment must be allowed to come to rest before the drop is deposited. The glass rods kept for the purpose should be of the same size, and these may for convenience be kept in the caustic potash vessel. When one is taken out, it should be shaken in water and wiped dry on a clean cloth. On dipping it into the oil, etc., it may be stirred round to mix the layers, if any, and then allowed to drain until the drops fall slowly; and the eye must determine when the rod is to be carried over the water, so as to deposit one, and only one drop, neatly and gently without any disturbance. In this, as in all other matters, doubtless each operator will have his personal equation, so that one man's result may not be precisely the same as that of another ; but if the foregoing directions be attended to, sufficiently good cohesion-figures will be produced. Gentlemen have come to me, and have complained of their inability to get consistent figures ; but on inquiry I have found their glasses not clean, or the mode of depositing the drop

unsteady. In one case I saw a gentleman drop the liquid from a height of *ten* or *twelve* inches. I may also remark that in the case of fixed oils, it is of no use placing a second drop after the first one has failed, for in such case, the second drop either simply flattens, or in the case of some essential oils presents a beautiful example of the spheroidal condition of liquids at ordinary temperatures.

With some other volatile oils a second drop will displace the film formed by the first and produce a second cohesion figure on the same surface. With respect to the ethers, alcohol, etc., it is different: each drop forms a sharp and well-defined figure, lasting only about a second, and hence the best way of exhibiting such figures is to have the liquid in a dropping-tube, and allow drops to fall in regular succession on the surface of the water, by which means a regular succession of figures may be kept up and their characters studied. Here is some of Dr. Morson's creosote. A drop placed on the surface of two ounces of water forms a highly characteristic figure, sailing about with a vibratory, crispating edge. In the course of seven minutes this drop becomes gradually disposed of by solution; or in other words, the adhesion of the water completely overcomes the cohesion of the liquid, and diffusion spreads it through the mass of the liquid. A second drop may now be placed on the same surface. It exhibits the character of the first figure in a mitigated form; it is less active; it is disposed of by solution in 12½ minutes; a third drop is disposed of in 25 minutes; a fourth drop ceases to give a cohesion figure at all: it is not disposed of after 110 minutes. In fact, the two ounces of water are saturated: that is, the adhesive force of the water and the diffusibility of the creosote are destroyed. Increase the quantity of water, and we restore the adhesive force and diffusibility in proportion to the quantity, and the struggle between the water and the creosote sets in again with the characteristic figure. Here is a specimen of carbolic acid. The figure is very different from that of creosote, and its duration is very much less. And here it may be noted that some of the figures of oils, etc., are very durable, remaining on the surface for hours; and even among volatile oils

the characteristic portions of some of them remain for a long time.

The strong adhesion between water and an oil may be shown by taking a slice of one of the seeds of the castor-oil plant and throwing it on the surface of clean water, when it will rotate feebly, after the manner of camphor on the surface of water, in consequence of the oil which diffuses from it over the surface in one direction producing rotation by reaction in another direction; but after a few turns the oil becomes equally diffused all round, and the motion ceases. Castor-oil seeds are heavy, they partly sink in cold water, and slices sink rapidly in hot.

The oil that escapes from the seed upon the surface of water does not form its cohesion figure. To get this we must allow a single drop to descend gently near to the surface of clean water, and the result will be a figure of extraordinary beauty. The drop will flatten into a disk, from which there will proceed a number of perfect iridescent rings, showing most of the colors in Newton's seven series; but beyond, and bounding these rainbows, is a broad silvery corona of exquisite delicacy, which almost immediately breaks up into a charming lace-like pattern, which I have feebly attempted to represent on the diagram before you. These effects last some seconds, but gradually the color disappears, the lace-like pattern follows, and a large colorless disk, with a well-defined edge, is left on the surface of the water. It undergoes some change, due to atmospheric exposure, but remains permanent for hours.

Such is the figure produced by the various specimens of castor oil that I have examined. They are of different growths, but are I believe all pure, and supposing the specific gravity of all these specimens to be about 0·969 there is no reason why their cohesion figures should not resemble each other at about 60° F., which I take to be the mean temperature of an inhabited apartment both in winter and in summer. There are obvious reasons, with a viscid oil like castor, and other oils that are sensitive to cold, why this test should be applied at a genial temperature. Some of the animal oleines, for example, are solid at about 40°. These may be perfectly fluid in a warm room, but if water be brought in from a cistern at 40°, and be poured into the test-glass, the drop, as soon as it is deposited,

will be chilled, and even become opaque, and the experiment fail; so that attention to temperature is important.

Another precaution refers to extent of surface. By increasing this we increase the adhesive force, and the figures may be poor and thin, and even torn up, before their characters can be studied. I have found a surface of four or four and a half inches in diameter well adapted to this inquiry.

Now comes the question of admixture of oils. Castor oil is so abundant and so cheap that there is no great inducement, so far as I know, to mix it with an inferior oil, supposing one very much cheaper could be found. But let us imagine that lard oil, for example, were wanting employment in the market, and that as a secondary product it could be obtained cheaply,—could the admixture be detected by this method of cohesion figures? My answer is, that in all the cases of admixture which I have examined, the features of the two oils are manifest in the cohesion figure; and these are, in general, very distinct, if the standard figure be examined by the side of the suspected figure. My memory is sufficiently retentive of these figures to enable me to tell immediately whether a figure varies from my standard. Not that my standard is necessarily the correct one; because in all cases I have had to depend upon others for the integrity of my specimens; and, in like manner, the gentlemen who have supplied me, may in their turn have to depend upon others. So that the production of an undoubted specimen is not always easy, unless prepared at home, which is also not always easy. At the International Exhibition I often watched the process of crushing linseed and expressing the oil; and I obtained specimens of the product, including the seeds. Now, thought I, I have an undoubted specimen of linseed oil; but on examining the seeds they were found to be mixed with about *one-fifth* of other seeds, so that my specimen of linseed oil from this source could not be relied on. Other circumstances may modify the cohesion figure, such as differences in the climate, or in the season under which a crop is gathered. Thus, oil of lavender varies somewhat in specific gravity in different years from the same farm, and I have observed that the beautiful carrageen-moss pattern produced by this oil is more minute in some specimens than in others; but the pattern is still the

same, in the sense that the Queen's head is the same, whether seen on a sovereign or on a half-sovereign.

In general, when there is an admixture of oils the characters of the two figures appear at once. Thus, olive oil has its cohesion figure; oil of sesame, with which it is often mixed, has quite another figure; a mixture of the two in various proportions will give a figure which is neither that of olive oil nor of sesame, but giving the characters of both, leaning of course to the side of that which is in excess. In some cases, however, the characters of the added oil do not at once appear, and this is the case when lard oil is added to castor. The figure opens in the same beautiful manner, and goes through its lovely phases, with a difference, it is certain, that requires a practised eye to detect; but there is no difficulty in detecting the lard oil among the residual phenomena of the experiment. Outside and beyond the castor-oil figure, we have numerous small blotches of lard oil, which are entirely absent from the residual phenomena of the pure castor-oil figure. I have selected lard oil as being the most common source of admixture; I suppose as much as ten per cent. might be added without greatly reducing the viscidity of castor oil. Doubtless any large admixture, if it were worth while, of olive, nut, etc., oils, would be at once seen by the increased fluidity of the castor oil; but I do not imagine any difficulty in detecting these oils in the mixture, their nature, and even amount (roughly) by means of their cohesion figures.

I do not give diagrams of the figures produced by these various admixtures. The subject requires an education of the eye, which is soon completed, as far as the figures are concerned, for any one who works at the subject; and no one can work at a subject long without getting that technical kind of familiarity which no books or graphic illustration can supply.

Croton oil furnishes a magnificent cohesion figure which may be represented as a very enlarged pattern of that of castor oil. Whether a small admixture of croton oil, such as one per cent. with castor oil, could be detected by means of the resulting figure, I am not yet prepared to say. I think there is no difficulty in detecting five per cent.

Oil of turpentine forms a very characteristic figure. It

flashes out on the surface of water into a large well-defined film, the edge is marked by a double row of small bosses, the outer being the smaller; in the course of a few minutes irregular patches of iridescent color appear on the surface, the film then becomes perforated by a multitude of minute holes, and the fourth and final stage is an exceedingly delicate resinous network, which is very permanent. Oil of turpentine is, I am told, sometimes mixed with castor oil as a vermifuge. It is perfectly easy to detect the admixture by means of the cohesion figure.

I fear I have left myself but very little time for any remarks on balsam of copaiba. The readiness with which this substance unites with the oils, both fixed and volatile, renders an easy and reliable test desirable. A drop of the pure balsam spreading out with its cohesion figure on the surface of water is a magnificient sight. It consists of a succession of sharply cut, expanding, superposed disks, glowing with the most brilliant iridescent colors, of a lustre all but metallic. These disappear when the adhesion of the surface is satisfied, and a clean, sharply defined, colorless disk is left on the surface.

Now I am told that balsam of copaiba is often mixed with castor oil in various proportions, to the great embarrassment of the medical practitioner. He is taught by the older Pharmacopœias to shake up the balsam with alcohol; but as castor oil is also soluble in alcohol, the test is worthless. The magnesia test is troublesome, and a drop on writing paper almost equally so; but a drop on the surface of water, so far as I have examined it, instantly detects the admixture. The castor-oil figure has narrow iridescent rings, and a wide and beautiful lace border; the balsam figure has wide rings, a clean cut edge, and no border; but curiously enough, the mixture of the balsam with the castor oil gives a figure with no color, and a scanty perforated border.

I have not tried this experiment with various proportions of castor oil. Indeed, my object to-night is not to lay before you a finished work, but rather to invite attention to the subject, and to court inquiry and examination. When I brought this subject before the British Association at Manchester two years and a half ago, my object was rather scientific than practical. I wished to establish the principle that cohesion asserts itself in

the case of liquids in the production of definite figures, as it does in the case of solids in building up crystals. The principle has, I believe, been admitted; but I have made no great progress in its practical application, partly from the difficulty I have had in procuring pure specimens, and partly, I suppose, from my preference for scientific inquiry, rather than practical application.

In conclusion, I must thank Professor Bentley for a very good specimen of wood oil, which I believe has been imported as East India copaiba. It makes a very good figure, a sort of inferior copaiba figure on a small scale; but it cannot for a moment be mistaken for copaiba, or any other figure that I am acquainted with. I have not tried the effect of it when mixed with copaiba, nor have I had an opportunity of examining jatropa oil, which is sometimes mixed with copaiba. There can be no difficulty in detecting admixtures of turpentine by this method.

I must also take the opportunity of Professor Miller's presence here to-night, to thank him for the warm interest which he has taken in this subject from the first. He witnessed my earliest experiments, and it is owing to his encouragement and advice that I have been induced from time to time to push on with the inquiry.—*London Pharm. Journ.*, *March*, 1864.

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## THE TOOT-POISON OF NEW ZEALAND.

By W. Lauder Lindsay, M. D. and F. R. S. Edin., F. L. S., etc.

During a tour through the New Zealand provinces in 1861–62, the writer was struck with the abundant evidences which everywhere presented themselves of the ravages produced among the flocks and herds of the settlers by the *Toot-plant*, one of the most common indigenous shrubs of those islands. In many cases of losses by individual settlers brought under his notice, the amount from this source alone had been from twenty-five to seventy-five per cent. In Otago particularly were such losses felt during the height of the gold mania, from July to December, 1861: the traffic between Dunedin and Tuapeka gold-fields requiring the service of large numbers of bullocks, a great proportion were lost by Toot-poisoning. In colonies which as yet, at least, have depended for their prosperity almost solely on

pastoral enterprise, such losses form a material barrier to prosperity; and the concurrent testimony of the colonists in every part of New Zealand proves the great desirability of determining the nature of the Toot-poison, the laws of its action on man and the lower animals, and its appropriate antidotes or modes of treatment. With a view to assist in the attainment of these aims, the writer has made notes, on the spot, of a large number of instances of the poisonous or fatal action of the plant on man —adults as well as children—and the lower animals, and had brought specimens home for chemical examination. The chief results of his investigations may be thus stated:—

1. The Toot-poison belongs to the class of *Narcotic-irritants*.

*a.* Its action on man includes the following symptoms:—coma, with or without delirium; sometimes great muscular excitement or convulsions, the details differing in different individuals; during convalescence, loss of memory, with or without vertigo.

*b.* In cattle and sheep, they include vertigo, stupor, delirium, and convulsions; curious staggerings and gyrations; frantic kicking and racing or coursing; tremors.

2. The poisonous portion of the plant,

*a.* To man, is generally the *seed*, which is contained in a beautiful, dark purple, luscious berry, resembling the blackberry, which clusters closely in rich pendant racemes, and which is most tempting to children; occasionally the young *shoots* of the plant, as it grows up in spring.

*b.* To cattle and sheep, in almost all cases, is the young *shoot*, which is tender, and succulent, resembling in appearance and taste the similar state of asparagus.

3. The following *Peculiarities* exist in regard to the action of the Toot-poison:—

*a.* A predisposition must exist, such predisposition being produced in cattle and sheep by some of the following conditions or circumstances:—The animal is *not habituated* to the use of the plant; it suddenly makes a large meal thereof after long fasting, or long feeding on drier and less palatable materials, or after exhaustion by hard labor, or hot, dry weather. From some such cause the digestive system is deranged, and is susceptible of more serious disorder from the ingestion of food to

which the animal is, at the time, unaccustomed. Hence Toot-poisoning frequently occurs in animals which have just been landed from a long and fatiguing sea-voyage, during which they have been underfed or starved, to whom the young Toot-shoots present the most juicy, fresh, pleasant diet.

*b.* On the other hand, the same kind of animals, *habituated* to the use of the Toot-plant, not only do not suffer at all, but for them it is regarded as quite equal in value to, and as safe as, clover as a pasture food. It is an equal favorite with cattle and sheep, whether they have been habituated or not.

*c.* The predisposition in man is probably produced by analogous conditions depressing the tone of his nervous and digestive systems, or directly deranging them. *Children* are affected out of all proportion to *adults*.

*d.* Adults who have suffered from the poisonous action of Toot under certain circumstances have been exempt from such action under certain others,—the same parts of the plant having been used, and apparently in the same way, in both sets of instances. Moreover, the Toot-berries enjoy, both among the Maoris and colonists, an enviable notoriety on account of the agreeable and harmless wine and jellies they are capable of producing, the former whereof especially has long been greatly prized. The *seeds*, however, in these cases probably do not enter into the composition of the said wine and jellies.

4. The current *Remedies* for Toot-poisoning among the settlers are, in regard to—

*a.* Cattle and sheep—mainly bleeding, by slashing the ears and tail. Belladonna has been variously tried, and favorably reported on; by others, stimulants are regarded as specifics (carbonate of ammonia, brandy, or a mixture of gin and turpentine, locally known as "Drench"). Whatever be the nature of the remedy, there is no difference of opinion as to the necessity for the promptest treatment, since, at a certain stage of the action of the poison, *all* remedies appear equally inefficacious.

*b.* In man, the nature of the remedy is still more varied, though emetics and stimulants seem the most rational of those usually had recourse to.

5. The *Toot-* or *Tutu*-plant is the *Coriaria ruscifolia*, L. (the *C. sarmentosa*, Forst.) The plant is variously designated by

Maoris and settlers in different parts of the New Zealand islands; and this of itself indicates how familiar it is, and how abundantly and widely distributed. The genus *Coriaria* is a small one, and, if not belonging to a sub-division of the Natural Order *Ochnaceæ*, probably represents a separate Order closely allied thereto and to the *Rutaceæ*. The most distinguished botanists, however, are at issue as to its precise place and alliances in the vegetable system. They are in similar dubiety as to the *species* of the genus, and the *varieties* of the species *C. ruscifolia*, L. In New Zealand there appear to be at least three *Coriarias*, which some botanists regard as mere varieties of *C. ruscifolia*, L., and others consider separate species. The writer had made, in July, 1862, an examination of all the species of the genus *Coriara* contained in the Hookerian and Benthamian Collections at Kew, the result whereof was a strong conviction of the necessity for a critical revision of the whole genus, throughout all its species, wherever distributed. The writer considers the specific names of the Toot-plant (both *ruscifolia* and *sarmentosa*) objectionable, as not truly applicable or descriptive; and proposes the specific term *C. tutu*, the Maori name of the plant, as more convenient to indicate the *type* of the species, leaving such terms as *ruscifolia*, *thymifolia*, and *sarmentosa*, to represent varieties or other species, as a subsequent critical examination of the genus may render necessary or desirable.

In contrast to, and in connection with the toxic action of *C. ruscifolia*, the writer may remark on the better-known poisonous properties of *C. myrtifolia*, familiar as an adulterant of senna, and on those of other species of the genus *Coriaria*.* He

* *Coriaria myrtifolia* is known in New Grenada under the name of the "Ink-plant," and the following letter respecting it, from Dr. Jameson, of Quito, was read recently at a meeting of the Linnean Society:—

"I am anxious to have Dr. Hooker's opinion of the 'Ink-plant.' There is a tradition here respecting this vegetable-juice that merits attention. It happened, during the Spanish Administration, that a number of written documents, destined to the mother-country, were embarked in a vessel, and transmitted round the Cape. The voyage was unusually tempestuous, and the documents got wetted with salt water. Those written with common ink became nearly illegible, whereas those written with 'Chauchi' (the name of the juice) remained unaltered. A decree was thereupon

announces his belief that the whole genus *Coriaria* must be considered endowed with poisonous properties, probably of the narcotico-irritant class, and that, as such (especially in reference to the extent and importance of the economic losses caused by such species as Toot), it is eminently deserving of thorough scientific investigation.

Under this head he may point out the fact that—

*a.* While certain animals seem to be themselves exempt from, or insusceptible to, the action of the poison, they may, by feeding upon certain species, or certain parts of some species of *Coriaria*, and thereby assimilating or secreting the contained poison in their tissues, communicate poisonous effects, or become poisons, to man or the lower animals, to which they (the animals first mentioned) have become articles of diet. He would cite a recent instance in connection with *C. myrtifolia*, in which several persons near Toulouse were poisoned by a dish of snails which had been fattened on its leaves and shoots.

*b.* That Royle, in reference to the fruit of *C. Nepalensis*, Peschier, of Geneva, in regard to *C. myrtifolia*, and other authorities in regard to other species of *Coriaria*, have published instances of their *harmless* or even *beneficial* effects, under certain circumstances, on man or the lower animals. Such conflicting statements would appear to indicate that there are peculiarities in the action of the poisonous principles of all the *Coriarias*, or discrepancies in the records of instances of the said action, which discrepancies or peculiarities demand reconciliation or explanation at the hands of competent scientific experts.—*Pharm. Journ., Lond., February*, 1864, from *Proceedings of the British Association.*

issued that the Government communications should in future be written with the vegetable juice. . . . I do not vouch for the correctness of this statement, but I have constantly heard it repeated from different sources. I generally use this ink in preference to the commercial article, as it is not so apt to corrode the steel pen. The present note is written with it, and has no admixture whatever, being only yesterday expressed from the fruit. When newly written, its color is reddish, becoming black after a few hours."—Ed. Pharm. Journ.

## DR. McMUNN'S ELIXIR OF OPIUM.

A correspondent from this city has furnished the Philadelphia *Medical and Surgical Recorder* with the following recipe, which, he says, was found among the effects of the late Dr. Chilton;

"1. Take five pounds of Turkey opium, cut in small pieces and dried, and put it into a large strong glass jar with a wide mouth, and pour on it sulphuric ether enough to a little more than cover it; then stop the jar tight with a glass stopple to prevent its evaporation; set it away in a cool place, and stir it daily with a stick so that all the lumps may be broken. At the end of a week drain off the ether, and again pour on as much more, and repeat stirring it every day for a week longer, when it may be drained off as before. Then stop the jar tight, and lay it down on its side so that all the ether that accumulates near its mouth may be drained off, and repeat doing so until the opium is all dry. Then expose it to the open air for a few days.

"The sulphuric ether extracts from the opiumt he *Narcotine*, which is its most deleterious principle, and also deprives it of its peculiar noxious odor, so that the elixir will not smell of it thereafter.

"2. Now to free the opium of the smell of the ether, and to extract its valuable medicinal principles, boil it in water, as follows: Pour into a tin boiler four gallons of pure soft water, and when hot (but not boiling) put in the opium, when a great ebullition will take place, which is owing to the evaporation of the ether. Then let it boil ten or twelve minutes, occasionally stirring it so that the lumps of opium may be all broken and dissolved. Then set it away till the next day, when it should be strained through a cloth strainer, and if there be not four gallons of the solution, pour on the leached opium boiling water enough to make that quantity when it is strained and clear.

"When in the state of watery solution, it is better to be kept in stone crocks that will hold about two or three gallons each, and in a cool place as a cellar; after standing five or six days the clear solution should be carefully dipped off into a large tin can. The skimmings and dregs should be strained, and when clear put with the other.

"3. To this four gallons of watery solution, add five and a half gallons of alcohol, and stir the mixture thoroughly; then

cover the can tight so as to prevent evaporation. After standing a few days, the clear elixir may be carefully dipped off into another can, and the dregs at the bottom strained, and when clear poured into the other.

"Now, after standing undisturbed for a few weeks it will be fit to use. It will be equivalent to laudanum, both in its strength and the size of its dose."

It was, doubtless, upon receiving this knowledge of making the preparation, that Dr. Chilton was induced to give the following testimonial:

"Dr. John B. McMunn, having made known to me the process by which he prepares his "ELIXIR OF OPIUM," and wishing me to state my opinion concerning it, I, therefore, say that the process is in accordance with well-known chemical laws, and that the preparation must contain all the valuable principles of opium, without those which are considered as deleterious and useless. J. R. CHILTON, M. D., Operative Chemist, &c."—*Am. Drug. Circular.*

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## INDIGENOUS DRUGS.

Now that almost every article of foreign production costs at least twice as much delivered in New York as it was sold for by the London dealer, the question naturally arises—Is there no possibility of our superseding articles necessarily imported from abroad by American productions, thus reducing the now enormous cost of drugs to the consumer, and restoring the greatly reduced profits of the dealer? Against the attempt to bring in an indigenous plant for use in medicine, the traditional reputation of the old and long tried *remedies* is constantly arrayed. The writings of physicians of half a century ago still furnish the staple of much of the teaching in our schools, and our text books are occupied with elaborate descriptions of remedies, some of which are now rarely attainable, while their reputation is perhaps chiefly due to their having been "known to the ancients." The absurd adherence of our Pharmacopœia to scammony as an ingredient of our leading popular chathartic pills is an illustration of this conservatism, the practical operation of which is, that some of the officinal formulas are ignored by nine of every ten of the manufacturers who furnish our preparations; and the prices which pharmaceutists can afford to pay with a view to the

popular demand being far below the possibilities of the case, we can no more blame the deficiency upon the manufacturer or upon the pharmaceutist than upon the physicians or consumers themselves.

It is the misfortune of almost every good thing to be damaged by our zealous advocates, and it happens that, owing to the existence of the sect of so-called Eclectic physicians, who seem to have founded their system of practice upon the narrow idea that a medicine must be of vegetable origin, and even that it must have grown on American soil, to merit their approval, the true importance of many of our indigenous remedies has gained ground but slowly. The empirical processes of the Eclectic manufacturers, by which the attempt is made to reduce all the indigenous remedies to a uniform form of preparation, unwarranted by a scientific appreciation of their varied composition, has also stood much in the way of their reputation. Many of the so-called concentrated remedies are far from representing the drugs from which they were obtained; and any estimate of the therapeutic value of those drugs founded upon experiments with the Eclectic resinoid principles obtained from them, is liable to mislead in regard to their real use and adaptations.

We believe that with scientific pharmaceutists mainly rests the work of bringing the numerous American drugs which are readily obtainable, and many of foreign origin which are capable of easy propagation on our own soil, to a fair trial upon their merits; and we would suggest that every effort in this direction is not only a good business move, but tends directly to promote the prosperity and independence of our own country, and to diffuse its rich and useful productions throughout the world. —*Am. Drug Circular.*

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## ON THE DECOMPOSITION OF IODIDE OF MERCURY.

By H. Rose.*

Iodide of mercury is very easily decomposed by cyanide of potassium. To estimate the mercury in the iodide the following process may be adopted. The cyanide of potassium is first rubbed in a mortar with twice its weight of quicklime. A little carbonate of magnesia is then placed in a tube closed at one end;

*Poggendorff's Annalen, bd. cxviii., s. 165; Bulletin de la Société Chimique, January, 1864, p. 25.

the iodide mixed with eight or ten times its weight of the cyanide, and lime is next introduced; then a layer of the cyanide and lime is added; and lastly, a little carbonate of magnesia is placed on the top; the tube is now drawn out and bent, and the extremity is made to dip into a receiver containing water. Heat is now applied to the mixture, beginning at the top, and the mercury distils over.

Other mercuric compounds may be decomposed in the same manner.

According to Carius, iodide of mercury is completely decomposed by digestion with nitrate of silver in a not very acid solution. The reaction is definite enough to allow of its being utilised for an estimation. Iodide of silver, like iodide of mercury, is slightly soluble in nitrate of mercury.

The red iodide of mercury may be reduced by a solution of protochloride of tin, but the reduction is not complete. With an excess of hydrochloric acid the reduction is impossible, and the iodide becomes yellow when the mixture is heated. When, however, the mixture is supersaturated with potash, the reduction takes place. Iodide of potassium will also prevent the reduction with protochloride of tin, unless an excess of potash is present.

Metallic zinc completely decomposes iodide of mercury in the presence of water, forming iodide of zinc.—*Lond. Chem. News, February* 27, 1864.

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## ON A NEW METHOD OF ANALYSING OIL CAKE.

By W. B. Tegetmeier.

Some time since I was requested to examine the products and report upon the process of a new method of extracting oil from crushed seeds by means of bisulphide of carbon in place of pressure. I found that the oils obtained by this plan were of very superior quality, bright, free from albuminous and mucilaginous matters, and destitute of the slightest trace of the bisulphide.

The residuary mass of ground seed was also much more free from oil than that left after pressure.

Being desirous of verifying my own opinion, I forwarded a sample of the crushed seeds after extraction to professor A.

Church for his analysis. His report of its composition was as follows:—

| | |
|---|---|
| Water .. .. .. .. .. .. .. | 10.23 |
| Oil .. .. .. .. .. .. .. .. | 4·70 |
| Starch, mucilage .. .. .. .. .. | 35·63 |
| Albuminous compounds, containing 5·153 of nitrogen .. .. .. .. .. .. | 32·29 |
| Indigestible fibre, cellulose .. .. .. | 9·45 |
| Ash .. .. .. .. .. .. .. .. | 7·70 |
| | 100·00 |

Thus proving that much more oil was extracted by the chemical than by the mechanical process in general use, ordinary rape cake containing sometimes as much as 12 per cent. of oil, and linseed cake a much larger quantity.

So efficacious is the bisulphide in extracting oil from organic matters, that it is even superior to ether in this respect, and Professor Church informs me that he has adopted it as a cheaper and preferable means of analysis.

Thus the same sample of linseed cake under the old ether process gave 16·57 per cent. of oil. But treated in a precisely similar manner with bisulphide of carbon it afforded 16·79 per cent of oil.

The cost of ether in the analysis of oil cakes is so great that the suggestion of this efficacious substitute by Professor Church is one of very great practical importance, and I have therefore much pleasure in bringing it under the notice of the readers of the *Chemist and Druggist*, as there can be no doubt but that it is equally applicable to determining the amount of oil in any other seeds or in organic matters generally.

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## PHYSIOLOGICAL PROPERTIES OF NITRITE OF AMYLE.

Dr. B. W. Richardson read a paper on this subject before Sub-section D, of the British Association. He first described the mode of manufacture and the chemical properties of the nitrite, and then passed on to the physiological action. The first remarkable fact was that the nitrite when inhaled produced an immediate action on the heart, increasing the action of the organ more powerfully than any other known agent. As the

action of the heart rises, the surface of the skin becomes red, and the face assumes a bright crimson color. A little of the nitrite was here placed on a piece of bibulous paper, and passed round to show the effect on the face, and the effect was most remarkable, causing the faces of the persons who smelt the vapor to become instantaneously flushed. Carried to an excessive degree, the nitrite excites the breathing, and produces a breathlessness like that caused by sharp running or rowing. On animals, when the agent is given in large quantities, death is produced. The author at first thought that the nitrite, like chloroform, would cause anæsthesia; but experiments had shown that this view was not borne out. Animals would, it is true, lose consciousness; but when such a stage was reached, great dangers resulted, owing to the slowness by which the poison was removed from the body after its absorption. On the blood the nitrite produces darkness of color, but it does not materially interfere with coagulation in the body. In the lungs it excites congestion, and in the brain slight congestion. It causes no severe spasm and no sickness. After entering into certain other details, Dr. Richardson proceeded to say that the most remarkable effect produced by the nitrite was that in the lower animals—frogs, for instance—it led to suspended animation, which could be maintained for so long as nine days with perfect after-recovery. This fact was of curious historical interest. The ancients, especially Theophrastus (Paracelsus), had stated that there was a poison which, when taken one day would not take effect until some future day. This statement, long considered as a myth, had within the present year been shown to be true by Dr. Letheby, who had discovered a poison which really produced this phenomenon. In like manner the ancients had an idea that there were medicines which would for a time suspend life. The proceeding of Friar Lawrence in giving the distilled liquor to Juliet, was based on this old fiction, or shall we not say fact? The next point discussed by Dr. Richardson had reference to the mode of action of this poison. Were the effects produced through the blood, or by the nerves direct? The speaker said that he had been led to the conclusion, from previous experiments, that all poisons were brought into action through the blood; but this very commonly accepted theory

did not explain the immediate and powerful action which follows the exhibition of the minutest dose of the nitrite of amyle. He thought, therefore, that the action was immediately on the nervous system, and that such action, transferred to the filaments of nerves surrounding the arteries, paralyzed the vaso nerves, on which the heart immediately injected the vessels causing the peculiar redness of the skin and the other phenomenon that had been narrated. Dr. Richardson, in conclusion, said that nitrite of amyle, like to chloroform twenty years ago, was only to be considered a physiological curiosity. It might by its action suggest the cause of trance, and of what was called hysterical unconsciousness, and it might explain the mode by which certain analogous substances produced their effects on the organism. It had been suggested—naturally suggested—that in fainting, as from loss of blood or from fear, the inhalation of the nitrite of amyle might be of service. He (the author) did not, however, at the present moment recommend its use in medicine, because of the intensity of its action. This last point was at the present time under his inquiry, and he would report further results at the next meeting of the Association.—*Am. Jour. Med. Sciences, April,* from *Med. Times and Gaz., Sept.* 26, 1863.

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## ELECTRICAL PROPERTIES OF PYROXILINE-PAPER AND GUN-COTTON.

Prof. John Johnson, of Wesleyan University, has called my attention to a remarkable power in pyroxiline-paper of producing positive electrical excitement in sulphur, sealing wax, &c. His note is as follows:

Wesleyan University, Middletown, Dec. 24, 1863.

PROF. SILLIMAN—*Dear Sir*:—We are told by writers on electricity that sulphur, by friction with all other substances, becomes *negatively* excited; as cat's fur, on the other extreme, by friction with all other substances becomes excited *positively*. But a few days ago I made the discovery that sulphur by friction with paper pyroxiline (I will call it) is excited with positive electricity, as are also sealing wax, amber, &c. The paper is prepared in the same manner as

gun-cotton, which would also in all probability be found to possess the same property.

Inclosed please find some of the paper for trial. It was prepared by my son, M. M. Johnston.

Perhaps you will think the matter of sufficient importance to make a note of it in the Journal of Science.

Respectfully yours, JOHN JOHNSTON.

I have repeated and confirmed Prof. Johnston's experiment, extending it to gun-cotton. I find, as he suggests, that the latter substance produces the same excitement of positive electricity which is produced by the pyroxiline-paper. The most energetic effects are produced when vulcanized india rubber is the electric. The opposite effects in this substance produced by flannel and the gun cotton or pyroxiline-paper are very striking, and will form a good lecture room illustration. These substances also produce powerful positive excitement in glass. It is difficult from the use of pith balls alone to determine which produces the most powerful excitement, glass or hard rubber, when excited by gun-cotton or pyroxiline-paper. This seeming anomaly, confounding our ordinary means of discrimination in cases of electrical excitement, demands further investigation. It would appear that of negative electrics yet observed, these azotized species of cellulose are the most remarkable—in comparison with which the most highly negative electrics hitherto known become positive.—*Silliman's Journal*, Jan., 1864. B. S., JR.

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## A NEW HÆMOSTATIC.

Dr. Janssens has called the attention of the Brussels Medical Society to a new hæmostatic proposed by Professor Piazza, of Bologna. Repeated experiments have shown him that the alkaline chlorides render the clots formed by perchloride of iron much more compact, more homogeneous—in a word, more fibrinous. Hence M. Piazza has conceived the idea of mixing solutions of perchloride of iron and pure chloride of sodium, as in the following formula: Pure chloride of sodium, 15 *grammes*; neutral solution of perchloride of iron (30 degrees), 25 *grammes*; distilled water, 60 *grammes*. The chloride of sodium is dis-

solved in the water; the solution is then filtered, and the perchloride of iron is added. It is said that this hæmostatic has been successfully employed in St. John's Hospital at Brussels by MM. Rossignol and Janssens. It is not liable to produce violent local irritation, the perchloride of iron being diluted, while its efficiency is not impaired.—*Am. Journ. Med. Sciences, Jan.*, 1864, from *Bull. Général de Thér.*, 15 *Aug.*, 1863.

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## GOLD FIELDS OF NEW ZEALAND.

The gold discoveries in New Zealand, more particularly in the provinces of Nelson and Otago, are rapidly extending. In Nelson some very rich deposits have been found in the river Mangles, and the diggings on the rivers Buller and Wangapella are proving rich in the precious metal. The great drawback to the satisfactory working of the Nelson goldfields consists in the almost entire absence of roads. The country is very broken, extensive thickly wooded gorges and rugged precipitous mountains interposing enormous difficulties in the way of communication. The Nelson people are now seriously contemplating the construction of a railway to traverse the districts known to be rich in gold, copper and coal. The Coromandel goldfield, in Auckland province, languishes under the effects of the war raging in that province, and most of the miners have left until quieter times. Gold mining in Otago has, for the last three months, been seriously interrupted by the severity of the winter. But the worst part of the season is is now over, and warm genial days have latterly prevailed. Mining operations are, in consequence, reviving in every direction, and the goldfields' population is in high spirits. Many new discoveries have recently been made, and the areas of the goldfields are rapidly extending. A new goldfield, about seventy miles from Dunedin, in a north-easterly direction, was discovered about three months ago, and about 5,000 persons are settled there, doing remarkably well. It is confidently anticipated that the ensuing season will prove a very brilliant one. The quantity of gold produced by the Otago goldfields during the current year is 405,831 oz., and the export of the precious metal, 450,595 oz. In New South Wales there has

been no further development of the goldfields, and trade is rather dull. The most expansive part of the trade just now is the development of the coalfields. Many new mines have been opened, and the competition has led to a reduction in price, as well as to an improvement in quality.—*Journ. of the Soc. of Arts, Nov.* 20, 1863.

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## NEW PROCESS FOR SILVERING GLASS.

By M. A. Martin.

Among the large number of processes for silvering, Drayton's process is the best adapted for telescope glasses; but, as this process requires great skill on the part of the operator, I have endeavored to find some method, which, by its simplicity and sureness, might become general. After carefully studying and experimenting on all the known processes (aldehyde, sugar of milk, glucosate of lime, &c.), I have arrived at one, which, from its simplicity and the firm adherence of the layer of silver deposited, seems to fulfil all the necessary conditions. I begin by preparing:—1. A solution of 10 grammes of nitrate of silver in 100 grammes of distilled water. 2. An aqueous solution of pure ammonia, marking 13 degrees on Carter's areometer. 3. A solution of 20 grammes of pure caustic soda in 500 grammes of distilled water. 4. A solution of 25 grammes of ordinary white sugar in 200 grammes of distilled water. Into this pour 1 centimetre cube of nitric acid at 36 degrees, boil for twenty minutes, to produce the interversion of the sugar, and then make up the volume of 500 centimetres cube with distilled water, and 50 centimetres of alcohol at 36 degrees. This done, I prepare an argentiferous liquid by pouring into a flask 12 cubic centimetres of the solution of nitrate of silver (1), then 8 cubic centimetres of ammonia at 13 degrees (2), then 20 centimetres of the solution of soda (3); and lastly, make up a volume of 100 centimetres by 60 centimetres of distilled water. If the proportions have been properly observed, the liquid will remain limpid, and a drop of solution of nitrate of silver will produce a permanent precipitate; then after being left quiet for twenty-four hours

the solution is ready for use. Clean the surface to be silvered with a cotton plug impregnated with a few drops of nitric acid, then wash it with distilled water, drain and place it on supports on the surface of a bath, composed of the argentiferous liquid, to which has been added one-tenth or one-twelfth of the solution of sugar (4). Under the influence of diffused light the liquid becomes yellow, then brown, and after from two to five minutes the whole of the surface of the glass will be silvered; after ten or fifteen minutes it will have attained the required thickness; it must be washed first with ordinary water, then with distilled water, and stood upon its edge to dry in the air. The surface will then be covered with a light, whitish veil, easily removed by a little polishing rouge or chamois leather, leaving a brilliant surface perfectly adapted by its physical constitution for the purposes for which it was intended. —*Journ. Franklin Inst., March*, 1864, from *London Artizan, Oct.* 1863.

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## FINE CLAY AS A DRESSING TO SORES.

Dr. Schreber, of Leipzic, recommends the use of clay as the most "energetic, the most innocent, the most simple, and the most economical of pallicative applications to surfaces yielding foul and moist discharges." He moreover considers that it has a specific action in accelerating the cure. Clay softened down in water, and freed from all gritty particles, is laid, layer by layer, over the affected part to the thickness of about a line. If it become dry and fall off, fresh layers are applied to the cleansed surface. The irritating secretion is rapidly absorbed by the clay, and the contact of air prevented. The cure thus goes on rapidly. This clay ointment has a decisive action in cases of fœtid perspiration of the feet or armpits. A single layer applied in the morning will destroy all odor in the day. It remains a long time supple, and the pieces which fall off in fine powder produce no inconvenience.—*British Med. Journal, April* 11, 1863, *p.* 381.

[We can quite corroborate Dr. Schreber's observations, having used fine clay poultices for several years—chiefly, however, in cases of local inflammation requiring the application of cold. Rags wet in water, or goulard water, so rapidly become dry and

hot that the benefit from the cold application is completely lost. There is no dirt when the clay is enveloped in a piece of fine linen, and is not too fluid in consistence.—*Braithwaite,*] *from Am. Drug. Circular.*

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## Minutes of the Philadelphia College of Pharmacy.

The 43d Annual Meeting was held at the hall, 3d mo. 28, 1864. Present 20 members. The President in the chair.

The Minutes of the last Meeting were read and approved.

The Minutes of the Board of Trustees for the past six months were read by A. B. Taylor, Secretary of the Board. They inform us that George W. Eldridge has been elected a resident member of the College, and that the following Students of the School received the degree of Graduate in Pharmacy at the late Commencement.

| | | |
|---|---|---|
| Edward H. Buehler, | thesis on | *Helianthemum Canadense.* |
| Oliver Buss, | " | *Podophyllum Peltatum.* |
| Henry C. Croft, | " | *Rubus Villosus.* |
| John M. Cunningham, | " | *The Art of the Apothecary.* |
| Albert E. Ebert, | " | *Caulophyllum Thalictroides.* |
| Hiram Gold, | " | *Euphorbia Ipecacuanha.* |
| G. E. Jeannot, | " | *Acidum Benzoicum.* |
| Edward C. Jones, | " | *Leptandra Virginica.* |
| Samuel T. Jones, | " | *Sarracenia Purpurea.* |
| Joseph E. Moore, | " | *Menispermum Canadense.* |
| Henry B. Morris, | " | *Comptonia Asplenifolia.* |
| S. Mason McCollin, | " | *Urtica Dioica.* |
| Archibald C. McElroy, | " | *On Quackery.* |
| Alfred W. Newton, | " | *Myrtle Wax.* |
| George W. Notson, | " | *Rubus Villosus.* |
| Christian Schultheis, | " | *Sodii Chloridum.* |
| J. Henry C. Simes, | " | *Prinos Verticillatus.* |
| Edwin Thomas, | " | *The Ordeal Bean of Calabar.* |

A vacancy has occurred in the Board by the resignation of William Evans, Jr., from membership in that body.

Charles Murray, Esq., of Buenos Ayres, previously nominated, was now, on ballot, unanimously elected to honorary membership in the College.

The Publishing Committee made their annual report, showing an improvement in the financial prospects of the American Journal of Pharmacy, and that, notwithstanding the increased cost of issuing it, the Journal

will be continued in the same form and size as heretofore, without further encroaching upon the funds of the College.

The accounts of the Label Committee were also submitted.

The Committee on the Sinking Fund reported a farther reduction of the debt of the College.

Obituary notices, prepared by the Committee on Deceased Members, were read, commemorative of Dr. John Redman Coxe, Dr. Franklin Bache, Dr. Franklin Scammon, Dr. Robert P. Thomas, Frederick Brown, Samuel Sheppard and Theodore Dilkes. They were referred to the Publishing Committee.

Wm. C. Bakes presented, on behalf of the contributors to a fund subscribed for the purpose, imperial photographs of Daniel B. Smith, Peter Williamson, Charles Ellis, Elias Durand, Samuel F. Troth and Dillwyn Parrish, suitably framed for the walls of the College hall.

On motion of T. S. Wiegand, the thanks of the College are tendered to Mr. Bakes, for his interest and perseverance in carrying out this design.

A silver medal of the *Societé de Pharmacie*, of Paris, was presented to the College for preservation among its archives, by Alfred A. B. Durand, to whom the thanks of the College were voted.

The Annual Election was now ordered, and resulted in the election of the following:

*President.*

CHARLES ELLIS.

*First Vice President.*

Samuel F. Troth.

*Second Vice President.*

Dillwyn Parrish.

*Treasurer.*

Ambrose Smith.

*Corresponding Secretary.*

William Procter, Jr.

*Recording Secretary.*

Edward Parrish.

*Trustees.*

| | | |
|---|---|---|
| Dr. Robert Bridges, | Samuel N. James, | Daniel S. Jones, |
| T. Morris Perot, | Samuel S. Bunting, | James T. Shinn, |
| John M. Maisch, | Thomas S. Wiegand, | |

John C. Savery, for the unexpired term of Wm. Evans, Jr., resigned.

*Publishing Committee.*

Charles Ellis, J. M. Maisch, A. B. Taylor, E. Parrish and W. Procter, Jr.

*Committee on Sinking Fund.*

Samuel F. Troth, Ambrose Smith, Edward Parrish.

*Delegates to the American Pharmaceutical Association.*

Edward Parrish, Evan T. Ellis, Wm. Procter, Jr., Alfred B. Taylor, Charles Bullock.

OBITUARIES.

Dr. John Redman Coxe was born in Trenton, New Jersey, on the 16th of September, 1773. His education was commenced under the charge of his grandfather, Dr. John Redman, one of the most eminent physicians of his day, and the first President of the College of Physicians of Philadelphia. Early in life Dr. Coxe was sent to Europe to complete his education, and enjoyed the advantage of medical instruction at the University of Edinburgh, though he completed his studies in Philadelphia under the distinguished Dr. Benjamin Rush, and graduated in 1794 in the University of Pennsylvania. He afterwards revisited London, Edinburgh and Paris, with a view to perfecting himself in the requirements of his profession, and on his return located in Philadelphia for practice. During the first trying visitation of yellow fever in 1793, he was actively engaged in the practice of his profession, though not yet a graduate of medicine, and on its second appearance in the city in 1798 was made physician to the port. He was for several years physician to the Pennsylvania Hospital, and also of the Philadelphia Dispensary. In 1809 he was elected Professor of Chemistry in the University of Pennsylvania, from which chair he was transferred to that of Materia Medica in 1818, to be succeeded in 1835 by Dr. Wood. Dr. Coxe was a pioneer in Pharmacology, having issued an American Dispensatory in 1807, which passed through a number of editions, and was largely in use for many years. Among his contributions to this branch of medicine, Lactucarium may be mentioned as having been first brought into view as a narcotic medicine by him. His "Hive Syrup" is everywhere known as a domestic remedy, and has been officinal in the U. S. Pharmacopœia since the issue of the first edition in 1820.

In the introduction of vaccination into the United States he bore an active part, issued a work on the subject in 1800, and is said to have been the first to practice it in Philadelphia. His literary works were numerous; the last, regarded as a monument of learning and industry, was an Epitome of the works of Hippocrates and Galen. This translation was published in 1846, when he was about 72 years of age.

Dr. Coxe was elected an honorary member of this College in 1824. For a long period he has led a life of retirement, having survived most of the contemporaries of his early life, lived to see vast progress in the city of his adoption and in his native land, and great changes in the theory and practice of medicine. He enjoyed remarkable exemption from disease throughout his long life, and died of old age on the 23d of March, 1864.

Dr. Franklin Bache was born in Philadelphia in 1792; he was directly descended from the eminent statesman and philosopher of our Revolutionary era, Dr. Benjamin Franklin, being his great grandson. He was educated in the University of Pennsylvania, in which he graduated, first as a Bachelor of Arts, and afterwards, in 1814, as a Doctor of Medicine. After three years spent in the army, first in the capacity of Surgeon's mate, and afterwards as surgeon, he returned to practice in his native city, occupying at sundry times the position of Physician to the Walnut Street Prison and the Eastern Penitentiary. It was not, however, in the capacity of a medical practitioner that he was destined to attain eminence; his talents and inclination led him into the walks of science. As early as 1819 he issued his first work, entitled a System of Chemistry for the use of Students of Medicine. In the year 1826 he commenced his career as a public lecturer on Chemistry in the Franklin Institute of the State of Pennsylvania; from this position he was called, in 1831, to take the position of Professor of Chemistry in this College, Dr. Wood having been transferred to the chair of Materia Medica. It is among the chief boasts of this Institution that, in its own early history, before its school of Pharmacy had become extensively known, it was the means of bringing together in its faculty two men so eminently qualified to be pioneers in developing those branches of knowledge connected with its peculiar sphere of usefulness. For ten successive winters Dr. Bache lectured to the then small classes which met in this hall to receive instruction in Materia Medica and Chemistry, and in Pharmacy as taught incidentally by the two professors.

It was at the beginning of the year 1833 that the U. S. Dispensatory appeared, the joint work of Drs. Wood and Bache; it immediately took high rank as a clear and accurate treatise upon drugs, and following immediately on the Pharmacœpia, then just beginning to be appreciated as an authoritative standard, aided much in giving currency to its formulæ, and establishing it in the esteem of the Medical and Pharmaceutical professions. It would be impossible to estimate the influence of this work, in educating and informing the mass of those concerned in the sale, preparation and administration of medicines; it has undergone eleven revisions, and has been disseminated not only throughout our own country, but in Europe and elsewhere.

In 1841 Dr. Bache resigned his professorship in this College to accept a similar position in Jefferson Medical College, which he occupied to the time of his death. In the several Pharmacopœal Conventions he was engaged as an important member, and in that of 1860 was appointed Chairman of the Committee of Revision, which met at his residence in this city, and during over one hundred meetings carefully considered every detail of the work, and issued it in its present improved form. Dr. Bache was not without many evidences of the appreciation of his fellow-citizens, and especially of the medical profession; he was an Ex-President of the Ame-

rican Philosophical Society, Vice President of the College of Physicians, and President of the Managers of the Deaf and Dumb Asylum of this city; from some of these bodies and from the Faculty of Jefferson College, it may be supposed, memoirs will emanate, which will more fully perpetuate his character and services to the cause of science and humanity. We have deemed it fitting that our records should show our appreciation of one, whose connection with our College has been a source of unalloyed satisfaction, and whose example and precept have been productive of such important effects upon our profession. Dr. Bache died on the 19th of March, 1864.

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Dr. Franklin Scammon was born in Whitefield, Lincoln County, Maine, October 23d, 1810. We first know of him as an apothecary and chemist, in Hallowell, Maine, where he practiced our art, devoting at the same time much attention to the Natural Sciences. He subseqnently studied medicine, graduated in Philadelphia, and returned to Hallowell to practice. Following the tide of emigration, he removed to Chicago about the year 1850. He was engaged in varied business pursuits, at one time manufacturing linseed oil. His taste for the Natural Sciences was a controlling element in his character, and led him to devote the last few years almost to Botany and kindred pursuits. He was elected President of the Chicago College of Pharmacy on the organization of that Institution, and was recently chosen Professor of Botany in the University of Chicago; his botanical collection was extensive and valuable, and he is said to have been an able professor. He was an associate member of this College. His declining health, for several years past, had cast a shadow over his pursuits, and on the 10th of February, 1864, he passed from earth.

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Dr. Robert P. Thomas was born in Philadelphia on the 29th of May, 1821. His father, Daniel J. Thomas, and his mother, who was a daughter of Robert Pennel, of Chester County, Pennsylvania, were descended from early settlers of this Commonwealth, and were members of the Society of Friends; both parents survive him.

The boyhood of Dr. Thomas was chiefly spent in his native city, where, for a time, he was a pupil in the Friends' Academy, Fourth below Chestnut Street, in which, since its establishment in 1689, many of the prominent citizens of Philadelphia have been educated. He was afterwards sent to Westtown Boarding School in Chester County, another old and famous institution of the Society of Friends. Here he gained a good English education, with the rudiments of classical learning, and doubtless acquired that taste for natural science which was conspicuous in his later career.

When about sixteen years of age, he entered the counting house of

Walters & Souder, shipping merchants, to whom he proved a valuable assistant; but his ambition, early directed toward the medical profession, led him to employ the hours usually devoted to recreation in enlarging the boundaries of his knowledge, and developing those faculties which were to be so usefully employed in after life. While engaged in mercantile pursuits, he acquired a knowledge of the French language, and commenced the study of medicine under the tuition of Dr. George Fox.

In order to promote his medical education, he obtained the appointment, in 1846, of Assistant Apothecary to the Philadelphia Dispensary, a position he filled for a year, with great fidelity and satisfaction to all with whom he was associated. In the year 1847 he took the degree of Doctor of Medicine in the University of Pennsylvania.

Dr. Thomas must have had his full share of those discouragements which await the young physician during the years which, in a large city, invariably intervene between the period of graduation and the time in which his talents and industry may win for him an honorable reputation and an independent support. No special good fortune surrounded his entrance upon his chosen career, and he was dependant upon his own indomitable energy and perseverance, with the encouragement of strong friends, for the degree of success to which he attained.

In the Franklin Medical College, established by Dr. P. B. Goddard, James B. Rogers, J. B. Biddle, Meredith Clymer and others, and promising a career of honor and success, Dr. Thomas obtained the position of Demonstrator of Anatomy, giving him an opportunity to perfect himself in a favorite science, and, as he doubtless hoped, of realizing substantial pecuniary advantages and professional reputuation. This college, however, was unable to compete with the older and more celebrated schools, and soon was abandoned. We have no accurate data as to his many essays designed to render available his energy and industry, and to promote advancement in the profession to which he had devoted himself, but can trace him throughout, as a laborious, enterprizing, zealous student and practitioner, giving ample promise of the success which ever attends upon those qualities, when combined with integrity and purity of character.

In 1849 he married Sarah, daughter of John Bacon of this city. His widow, survives him, with a family of three children, deprived thus early of a father's care.

In 1850 the chair of Materia Medica in this college having been vacated by the election of Professor Carson to a similar position in the University of Pennsylvania, Dr. Thomas became a candidate, and, recommended by his many sterling qualities, was elected to fill it. He immediately entered on the duties of his office with characteristic zeal, and from the first fulfilled its requirements to the entire satisfaction of all. With the class he was popular, from the clearness of his instructions, the urbanity of his manners, and the genuine goodness of his heart; to the members of

the College, who came in contact with him at its meetings and elsewhere, he attached himself closely in relations of confidence and friendship.

In the investigation and illustration of his subject, Dr. Thomas was indefatigable, and while he added to his own cabinet, he enriched also that belonging to the College. The first literary labor of Dr. Thomas, after entering upon the practice of medicine, was the translation from the French of the first edition of Caseux's Midwifery, a work which has since gone through three editions, and become a standard treatise on that subject. His writings, published in *The Journal of Pharmacy*, in the proceedings of the American Pharmaceutical Association and elsewhere, evince close observations and analysis, and are written with clearness and perspicuity. Of these we may specify his paper on Texas Sarsaparilla, published in our Journal in 1855, showing that this drug is not identical with the true Sarsaparillas; his paper on Garlic, published in the proceedings of the American Pharmaceutical Association for 1860, describing a variety of this drug found in the Philadelphia Market, and which he concludes is not a distinct species, but a hybrid, partaking of the nature of the garlic and of the leek; and a short essay on the Culture of Elaterium, in the Volume of Proceedings for 1862,—all exhibiting evidences of his talent and industry in the special department of Pharmacology.

Some interesting experiments on the influence of morphia in the color-test for strychnia, detailed in a paper published in the *American Journal of Medical Sciences*, were exhibited by him at one of the Pharmaceutical Meetings of this College in 1861. The presence of morphia was shown to modify the color-test for strychnia, as first ascertained by Dr. J. J. Reese, so as to render it quite unreliable for medico-legal investigations, as usually applied, and the admirable expedient suggested of isolating the strychnia from the morphia, where they are associated, by the use of chloroform in the presence of an excess of caustic potassa, thus avoiding the interference in cases requiring the test.

The most extensive editorial labors of Dr. Thomas were connected with the revision of Griffith's Universal Formulary and Ellis' Medical Formulary. Both these works were originally edited by Professors of this College—the former, by Dr. R. Egglesfield Griffith, appeared in 1850, some years after he had left this institution, and was re-edited by Dr. Thomas in 1854, who enlarged it by the addition of 70 pages of new matter, and improved it by original modifications.

Ellis' Formulary had passed through nine revisions before Dr. Thomas became its editor; he twice revised it, and it was the last literary effort on which he was engaged, the eleventh edition having been published but a few weeks before his death. In this work, which taxed his powers during the past winter, there is much to remind us of his mental traits, and a degree of completeness and accuracy which gives it value as a standard work of its kind.

From early life Dr. Thomas was of a serious and conscientious turn, and averse to the frivolities which are so apt to engross the young. In March, 1853 he attached himself to the Episcopal church, and was an active member of the vestry, and warden of Grace Church at the time of his decease.

In the year 1857 he was elected one of the attending Surgeons to the Episcopal Hospital, and was ever active and vigilant in the discharge of the serious duties attending his position in this institution. It was here that his character as a Christian physician prominently attracts our notice. While ministering to physical ailments he did not neglect suitable opportunities of directing the attention of his patients to the One Source from which alone resignation and strength in suffering can be derived. The officers of the Hospital have borne willing testimony to his patience, gentleness, and kindness in the discharge of his professional services.

The death of Dr. Thomas was sudden and very unexpected. He lectured to his class in this College on the evening of the first of February, apparently in health, and rather unusually lively and full of anecdote. By those nearly connected with him, however, it was observed that he appeared not as well as usual, and on the following morning, although he rose, he complained of symptoms which induced him to forego his usual round of duties, and very soon after to retire to bed. Alarming symptoms soon appeared, which called for prompt efforts to stay the progress of a disease which was rapidly loosening his hold on life. Every effort failed, and in thirty-six hours from the first appearance of the disease, his spirit passed away. A subtle epidemic influence, which has visited many of our citizens during the past winter, and has been generally characterized as spotted fever, is believed to have undermined thus rapidly his vitality without developing its usual visible signs.

Thus in the forty-third year of his age—in the full strength of manhood—with energies unrelaxed, and girded with the strength of experience for future usefulness—our associate, friend and preceptor, has been called from among us. In the language of the Rev. Bishop Potter at his funeral, "though he had attained to but little more than two score years, yet, with his Christian earnestness of purpose, he had lived full long enough to accomplish the great mission of this life."

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Frederick Brown was born in Philadelphia on the 12th of March, 1796. His paternal ancestors were among the English followers of William Penn; his mother was descended from a French family of Calvinistic faith, who fled to Holland and thence to this country, to escape persecution at the hands of the Romish Church. His early education was among Friends, and he continued to attend their meetings until some years after his majority, when his interest was transferred to St. Andrew's Episcopal Church, which he attended for more than 35 years.

At the early age of sixteen he was placed "apprentice" to Charles

Marshall, first President of this College, whose name stood prominent among the Apothecaries and Druggists of Philadelphia in that day, and whose store, in Chesnut Street above Second, was the frequent resort of many of the leading physicians and citizens. Here Frederick Brown remained for ten years, having obtained the confidence of his employers, and been promoted to the chief management of the business. On his determining, in 1822, to embark in business on his own account, he was proffered a loan by these friends of his youth, which aided him much in establishing himself at the location which has been, for so many years, connected with his name—a loan which his very first year's business enabled him to repay. This act of kindness, added to the many incidents of their intercourse, produced in Frederick Brown a warm attachment for the several members of the family of Marshall, whose memory he cherished, and whose virtues constituted a favorite subject of conversation with him in later life. On a recent occasion, when recounting the incidents of his youthful days, he completed a warm eulogium on the character of his dear old friends, Charles and Patience Marshall, with the assertion, which in this presence will well bear repetition, that "few nobler men ever lived than Charles Marshall."

His father died in 1815, and from this time, when he was but nineteen years of age, the care of his mother and younger sister devolved entirely upon him; from this exercise of filial love in his youth, he experienced the strength derived from early restraints upon self-indulgence, and devotion to high and noble duties, and in after life acknowledged himself a better man on this account.

In 1833 he married Charlotte Augusta Hoppin, of Providence, R. I., a companion with whom he lived in much harmony, his interests centering strongly in his home. His wife, daughter and three sons survive him, and the oldest son, a graduate of this College, bears his name, and succeeds to his large and prosperous business, at the north-east corner of Fifth and Chestnut Streets. This location is almost within the shadow of Independence Hall, and was connected with the administration of our government during the Presidency of Washington. The summer residence of Frederick Brown was at Burlington, N. J., where he had ample opportunity to gratify his taste for horticulture.

Though of latter years not actively engaged in the affairs of this College, we find, by reference to its Minutes, that he was one of the Committee appointed at the original meeting in Carpenter's Hall, February 23d, 1821, who, at the second meeting, held March 13th, brought forward the Constitution, which was the basis of the organization of this College. He was also elected one of the first Board of Trustees.

His connection with the Pennsylvania Hospital, as one of its Managers, continued for 23 consecutive years; during this time that noble Institution has undergone vast improvement and extension, and the Department for

the Insane has been built upon a scale which has made it one of the finest monuments to the philanthropy and public spirit of Philadelphia. In all these improvements and in the management of the Institution, Frederick Brown has had an active part, and his warmest interest and sympathy have been called forth in its behalf.

As one of the founders of Laurel Hill Cemetry, his name will long be connected with the improvement of our city. His attention appears to have been attracted to the utility of rural cemetries by visiting Mount Auburn, in the vicinity of Boston, in 1833. Soon after, a public meeting was held in this city to consider the subject, at which about 70 attended; at a second meeting the attendance had dwindled down to about 30, and the final meeting consisted of Frederick Brown, John Jay Smith, (formerly a member of this College,) and Benjamin W. Richards; these three associated into a company, to which Nathan Dunn was afterwards added, and they proceeded to purchase the property, and lay out the grounds which now constitute the far-famed Laurel Hill.

In 1858, his daughter being advised to seek a restoration of health in foreign travel, his arrangements were directed to a European tour: one objection only presented; his aged mother, then in her 89th year, having lost her mental vigor and become physically helpless, had so long been an object of his care and solicitude that he could not willingly leave home, lest he might lose the opportunity of himself closing her eyes, and laying her under the sod. Yielding to his apparent duty as a father, he had written to secure a passage by the most popular of the Liverpool steamers. The hour had arrived for his final determination, but his feelings overcame his reason. "I have thus far fulfilled my whole duty toward my mother," said he, "and I am in doubt if I ought to leave her now; I think no harm will come if I wait awhile." So he gave up the stateroom with the further remark, "Perhaps I may see my way clear to reconcile these opposing claims." That very day, on arrival at his summer home, he found his aged mother speechless from paralysis, and three days afterwards he closed her eyes in death. The journey was now accomplished—his daughter restored to health—and many pleasant memories treasured to be recalled throughout the remainder of his life.

In the autumn of 1863 his health failed. Distressing and enervating nausea seemed his chief symptoms, which increased upon him daily. No remedies seemed capable of arresting the progress of his disease, which was cancerous; and yet, from the testimony of those surrounding him, he never uttered one impatient exclamation or repining thought. During some months his illness progressed, till, on the 26th of February, he remarked that death was very near, and with calm cheerfulness bade farewell to wife and children, sisters and friends, without excitement. No fear of the future darkened his path into the valley of the shadow of death. His feelings near his close seemed much interested in the fate of

our beloved country, and he said he had hoped to see the end of this foul rebellion. On the morning of the 27th of February, 1864, he breathed his last.

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Samuel C. Sheppard was born on the 7th of Third month, (March,) 1803, at Greenwich, Cumberland County, New Jersey. Prior to 1820 he came to Philadelphia, and was placed with Thomas McClintock, then the proprietor of the store in South Ninth Street, (now 207,) to acquire a knowledge of the business of Druggist and Apothecary. When he attained his majority he obtained the situation of Apothecary to the Pennsylvania Hospital, where he remained for about eighteen months, and on withdrawing therefrom entered into business on his own account, at the store in which he had been an apprentice. This old stand, which thus became identified with his name, was kept by him as a retail dispensing store the remainder of his life, a period of near forty years. He changed, perhaps, less than most of the objects around him, and the march of improvement and enterprize left him rather in the rear, but his store still continued to enjoy a share of the patronage of the neighborhood. He was removed by death on the 7th of 10th month, (October,) 1863. He was a member of the religious Society of Friends. In the days of his pupilage the school of Pharmacy of this College was not fully organized, though it is believed he was among the first of its students. He became a member of the College in 1825.

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Theodore Dilkes was born in New Jersey, on the 28th of October, 1835. He came to this city at about the age of seventeen, and entered the store of Henry M. Zollickoffer, at the corner of 6th and Pine streets, as an apprentice to the Drug and Apothecary business. Under the care of his experienced preceptor, one of the old and highly respected members of this College, he acquired proficiency in the business of his choice, and graduated in our school in the spring of 1856.

On the death of his employer he became his successor in business, and was elected a member of the College in 1858. He was happily married, and a prosperous future seemed before him, when the seeds of that insidious disease, pulmonary consumption, began to develop themselves, and an illness of nearly three years, during one year of which he was prevented from attending to his business, terminated in death, on the 26th of November, 1863. A consistent member of the Methodist Church, his attention had long been turned to those interests which are eternal.

# Editorial Department.

American Pharmaceutical Association.—It has been usual to publish the announcement of the Annual Meeting in the May number of this Journal; but as the President has not sent us the notice, we presume he has concluded to postpone it until the July issue. Meanwhile we would suggest to those of our readers who owe service to the Cincinnati meeting, that they take time early and prepare their papers.

The Professorship of Materia Medica.—At the meeting of the Board of Trustees of the Philadelphia College of Pharmacy, held April 5th, (1864), Edward Parrish was unanimously elected Professor of Materia Medica in the School of Pharmacy, to fill the vacancy occasioned by the death of Prof. R. P. Thomas. This Chair is one of great importance in the scheme of instruction conducted in the School, and involves constant vigilance to keep up with the progress of science and discovery. The wide scope and intrinsic interest which attaches to the history of drugs in their botanical and commercial relations, affords a field for the gratification of a laudable ambition, and brings the Professor into direct contact with men of science. We congratulate Professor Parrish on his unanimous election, and wish him a successful career as teacher of Materia Medica.

Pharmacy in Great Britain.—At the present time the Pharmaceutical body of England is in a great ferment, owing to the proposed introduction of a new Pharmacy Bill into Parliament involving the interests of all connected with the supply of medicines. It will be recollected that the existing Act in reference to the charter of the Pharmaceutical Society, and the subsequent grant giving the members of that Society the sole right to employ the title of Pharmaceutical Chemist, applies only to a small portion of the whole body of practitioners, most of whom are known as "Chemists and Druggists." Three years ago the latter, feeling themselves aggrieved, formed a National Association, started a Journal, and have been gradually gaining an influence by united action which is raising their status. The object of the bill appears to be to bring about a fusion of the two classes by requiring a registration of all Chemists and Druggists, and making it imperative on all "Chemists and Druggists" to undergo an examination before they can go into business, after the 1st of January, 1865. We have not space for the other features of the Bill, but propose in a future number to give an exposé of the progress of the movement.

New York College of Pharmacy.—At the annual meeting of the College held in March, 1864, the degree of Graduate in Pharmacy was conferred on George G. Sands, of New York; James J. Skelley, of New York; Joseph F. Figueron, of Havana; Emilio Villaverde, of Havana. Mr. Geo. C. Close, Vice-President, addressed the graduates in a pertinent speech on the duties which they undertook in becoming pharmaceutists.

A general election of officers of the College, to serve the ensuing years, 1864 and 1865, was then gone into, which resulted as follows: *President*, H. T. Kiersted; 1*st Vice-President*, Geo. C. Close; 2*d Vice-President*, John Milhau; 3*d Vice-President*, Isaac Coddington; *Treasurer*, Thomas T. Green; *Secretary*, P. Wendover Bedford: *Trustees*, George D. Coggeshall, John Carle, Jr., Wm. Neergaard, F. F. Mayer, Wm. Wright, Jr., J. W. Shedden, A. W. Gabaudan, F. Frohwein, B. E. Hays.

*Delegates to the American Pharmaceutical Association*, H. T. Kiersted, G. C. Close, J. W. Shedden, F. F. Mayer, P. W. Bedford.

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Massachusetts College of Pharmacy.—At the annual meeting of the Massachusetts College of Pharmacy, the following named officers were chosen for the ensuing year: Thomas Hollis, President; Charles A Tufts, Samuel M. Colcord, Vice-Presidents; Henry W. Lincoln, Recording Secretary; James. S. Melvin, Corresponding Secretary; Ashel Boyden, Treasurer; George D. Ricker, Auditor; Trustees, Daniel Henchman, Joseph T. Brown, A. P. Melzar, R. R. Kent, Elijah Smalley, A. G. Wilbor, Isaac T. Campbell, James A. Gleeson,

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*The British Pharmacopœia, published under the direction of the General Council of Medical Education and Registration of the United Kingdom, pursuant to the Medical Act*, 1858. London: printed for the Medical Council by Spottiswoode & Co. 1864, pp. 444, octavo.

We have received a copy of this long looked for work, to which allusion has been frequently made, but our space will afford but a short notice of it in this number. In a prefatory chapter the reader is informed under what circumstances the British Pharmacopœia originated and replaces the three Pharmacopœias, heretofore in use in Great Britain and Ireland; and of the general plan of the work, consisting of two parts and an appendix. The greatest difficulty appears to have presented, in the Committee of Revision, to reconcile differences of opinion in regard to certain preparations, where the strength of the former preparations varied. In such cases the decision was generally in favor of the weaker preparation. The Committee have also attempted to "assimilate the strength of preparations of the same pharmaceutic form, in order that they may be prescribed in similar doses," but the reform in this direction was met by practical difficulties, which prevented the adoption of the principle systematically. The weights and measures, to be used in the new Pharmacopœia, early at-

tracted the attention of the Committee, and they wisely determined to settle this point before proceeding with the construction or revision of the formulas. The Dublin Pharmacopœia having already adopted the avoirdupois weight, and the opinion in favor of having but one kind of weight for selling and mixing prevailing, was the cause of the adoption of the commercial weight for pharmacopœial purposes, but to avoid confusion, the only terms in which the weights of the Pharmacopœia are expressed are the grain, ounce and pound.

Our readers have already, by previous notices, been made acquainted with the facts bearing on this subject, (see vols. xxxiv. and xxxv.) and we will not further remark upon it, except to wish that our own Pharmacopœia Committee had been induced to adopt the same standard. The first part of the British Pharmacopœia, entitled *Materia Medica*, differs from all previous editions, of that and of our own, in giving under each head the characters of the substance, as well as tests for its purity. The following will give the idea:

"ACACIA. GUM ARABIC.

One or more undetermined species of Acacia, *Linn.*

A gummy exudation from the stem; collected chiefly in Cordofan in Eastern Africa, and imported from Alexandria.

*Characters.*—In spheroidal tears from half an inch to an inch in length, nearly white, and opaque from numerous minute cracks, or in shining fragments; brittle, bland and mucilaginous in taste, soluble in cold water. The solution forms, with subacetate of lead, an opaque white jelly.

*Test.* The powder does not become blue on the addition of solution of iodine.

*Preparation.* Mucilago."

Another peculiarity of this part is the fact that it includes a large number of substances which are usually considered only in the second part of the book. For instance, spirit of nitrous ether and solution of acetate of ammonia are each in the officinal list, yet they are also among the preparations, and so of a large number of other preparations, more especially chemical substances. In some cases these short descriptions are useful in determining at once what the Pharmacopœia intends. Many of the tests appended seem wholly inadequate to determine the genuineness and purity of the drugs. Thus, Oil of Lemon is thus characterized:—

"Color pale yellow, odor agreeable, taste warm and bitter."

Others are peculiar, as that for Resin of Guaiacum, to which the following test is appended:—

"*Test.* A solution in rectified spirit strikes a clear blue color when applied to the inner surface of a paring of raw potato."

The reaction here is between the glutinous matter of the potato and the guaiac; and is a characteristic test. Whenever the chemical nature of the substance admits, its chemical formula is given. Thus, "Beberiæ Sulphas,

sulphate of Beberia. The sulphate of an alkaloid, $C_{38}$ $H_{21}$, $NO_6$, HO, $SO_3$, prepared from Beberu Bark.

Another peculiarity is the complete ignoring of the United States as a commercial source of drugs, which is intensely English. For instance, Guaiac wood is referred to St. Domingo and Jamaica; Kino to Malabar; Rhatany to Peru; Jalap to Mexico, but Tobacco is cultivated in America. Serpentaria from the southern parts of North America; whilst Senega, Sassafras, Podophyllum and Lobelia are all attributed to North America, and Canada Balsam, which is specially *North* American, is referred to Canada! It follows from this that, in British geography, North America is a country identical with the United States!

The second part of the work is occupied with the preparations arranged in classes in alphabetical order. There are no medicinal vinegars. Among the acids there are formulas for glacial Acetic, purified Arsenious, Citric, Hydrochloric, Nitric, Sulphurous, and Tartaric acids, besides others in our own codex. The formula for Aconitia is analogous to that in the U. S Pharmacopœia, but removes the fixed oil from the extractive matter and aconitia, by distilling off all the alcohol, diluting with water, and filtering when cold, instead of agitating with the evaporated liquid, a portion of Ether *after* sulphating it. The solid aconitia obtained by Ether is re-dissolved in acidulated water and precipitated by ammonia to get it in a pulverulent form. This prevents the disagreeable necessity of pulverizing the alkaloid. The continuous process for Ether is adopted, the product being afterwards purified and concentrated by agitation with quick lime and Chloride of Calcium. Benzoate and Phosphate of Ammonia are introduced; Tartar Emetic is called Antimonium Tartratum. All the medicated waters are made by distillation except camphor water, the recipe for which, half an ounce of camphor, broken into pieces and enclosed in a muslin bag, is retained for at least two days at the bottom of a jar containing a gallon of distilled water. Made in this way camphor water must be very much less active than when prepared by Hodgson's process with carb. magnesia, as in the U. S. Pharm. In the process for nitrate of silver, refined silver is directed, which in the appendix is stated to be pure metallic silver.

The process for atropia is the complicated one of Thein, and by no means so simple, and easy of execution, as that in the U. S. Pharm., in which the agency of chloroform is called in. Subnitrate of Bismuth is called *Bismuthum Album*. Calomel is called simply *Calomelas*, and is placed under this head, and not with the other mercurials.

We must here close for the present, and in a future number propose to continue this notice in reference to some of the more important preparations, more or less peculiar to British Pharmacy. The English Journals teem with severe criticisms of the British Pharmacopœia, and the professors of the Pharmaceutical Society have each been lecturing on it to large audiences of the members, showing up what are deemed its numerous imperfections.

## OBITUARIES.

### DR. FRANKLIN BACHE.

It is with deep regret we are called upon to record the death of Dr. Franklin Bache, who died at his residence in Philadelphia, after a short illness, on the 19th of March, in his 72d year. Dr. Bache, as a chemical teacher and writer, has been intimately connected with the progress of Pharmacy in the United States, and his last work as Editor of the United States Pharmacopœia, and as Chairman of its Committee of Revision, involved an amount of disinterested labor rarely extended by a single individual. Whatever he undertook was done well. Uncompromisingly strict in the reception of evidence, he adopted changes or suggestions with caution, and was highly conservative in reference to extending the boundaries of the Materia Medica. Notwithstanding this, he was easily approached with sound reasoning, and when convinced of the claims of a process or preparation, he gave it the full weight of his influence. It was our good fortune to have had Dr. Bache as chemical preceptor at the College of Pharmacy, and to have had many opportunities of observing his mental peculiarities in a long subsequent intercourse in labor connected with pharmacy. We never knew him to flag in the pursuit of duty, or to hesitate in giving his full attention to a matter, however troublesome, if it involved the accuracy or usefulness of the work in which he was engaged. It was this habit of accuracy more than anything else that gives value to his portion of the dispensatory, and has acquired for his writings the confidence of Pharmaceutists. As the necrological Committee of our College has, at page 276, given an official obituary notice, we will avoid further comment on the death of one for whom may justly be claimed a high place in the enduring memory of the pharmaceutists of the United States.

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### DEATH OF PROFESSOR EDWARD HITCHCOCK.

This distinguished scientific man died at Amherst, Mass., Feb. 27th, aged nearly 71 years; he was born at Deerfield, Mass., May 21st, 1793. Prof. Hitchcock's labors as a geologist, have placed his name among those who have materially aided in building up that great science; and as President of Amherst College his usefulness has been largely exhibited. In the language of Prof. Silliman, he was "earnest, simple and sagacious; indefatigable under all discouragements, his clear, firm grasp of truth sustained and raised him above all difficulties, and have secured him an honored name in science."

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The death of Dr. Benjamin Cutter, of Woburn, will be deeply felt in the community of which he had so long been a prominent and valued member. He had been feeble for a considerable time before his death, but his last illness was of short duration. Dr. Cutter was born in West Cambridge in 1803, and graduated at Harvard College in the class of 1824. He studied medicine with Dr. Francis Kittredge, of Woburn. Many valuable contributions from his pen will be found in former volumes of this Journal.—*Boston Medical Journal.*